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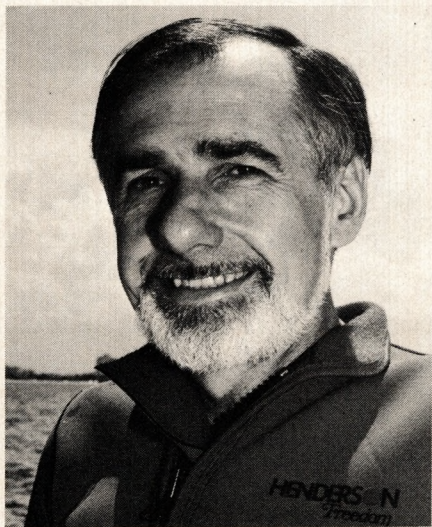
COVER

A diver samples one of Bonaire's best dive sites. Photo/Geri Murphy. Inset: Metridium anemones, by Steve Rosenberg.

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SDM Editorial

BY THE PUBLISHER



HOW TO RESCUE YOURSELF WHEN YOU'RE OUT OF AIR

expected thermoclines, strong currents or severe cold that deplete his precious air supply. He may go deeper than intended, be overweighted or fail to take the shortest route back. Any combination of these factors can contribute to a miscalculation of air consumption and thereby result in the abrupt termination of the dive plan.

Overloading is another, less frequent, cause of out-of-air emergencies. Divers unexpectedly encounter heavy objects they try to drag back to the dive boat or beach. These enticing collectibles include such items as: lost anchors, prized portholes, cannon balls, or simply a heavy piece of brass. Other more subtle forms of overloading include: a bulging sack of lobsters, a goodie bag stuffed with clams or abalone, a heavy stringer of fish or a bulky underwater camera housing bristling with accessories. All of these items represent additional weight and excess drag that can burn up an air supply.

Distraction is still another major cause of out-of-air calamities. In fact, distraction is regarded as a deadly killer because it catches the victim by surprise and increases the risk of panic. Divers frequently become absorbed in the beauty and fascination of the undersea world around them. They can lose track of time and forget to monitor their tank pressures.

When a diver runs out of air at depth he/she has a safety margin of approximately 15 to 20 seconds. This is barely enough time to check equipment (for a false alarm), make an accurate evaluation of the immediate situation and take the appropriate action for self rescue. No one can make this decision but the diver in trouble.

Octopus rescue is today considered the most desirable option for any out-of-air diver. It is a quick, simple and easy method of sharing air with your dive buddy while making an orderly retreat to the surface. However, octopus rescue requires the aid of a dive buddy who is not only equipped with an octopus unit, but also has a sufficient air supply to support two divers. Perhaps the biggest problem with this kind of rescue is that not every diver is equipped with an octopus.

Pony bottle rescue is perhaps a safer, more dependable alternative to the octopus since it allows you to make an entirely independent rescue without the aid of

a buddy. An auxiliary mini-tank complete with an extra regulator is strapped onto your normal scuba rig and carries an additional 12 to 15 cubic feet of air. The only disadvantage to pony bottle rigs is that they are expensive, bulky and add extra weight to your already burdensome scuba gear. At present, pony bottle devices are popular with advanced divers who engage in high risk dive situations such as cold water wreck, cave and ice diving.

Buddy breathing is one of the oldest and most widely taught methods for out-of-air rescue situations. This method has saved many lives in the past but has come under attack in recent years because of a number of double-death dive accidents. Buddy breathing can be potentially dangerous if both partners are not properly trained and well-practiced.

Emergency swimming ascent is perhaps one of the most controversial self rescue methods in diving today. Several years ago, this method was in hot debate among scuba instructor associations because of the inherent risk of air embolism. There have been a great many modifications to this method that have reduced the element of risk involved. The old "blow and go" method is obsolete. Today the student is taught to retain the regulator in the mouth while swimming slowly upward and breathing both in and out. Most instructor associations today agree that the advantages of swimming ascents far outweigh the risks. Most associations not only advocate the teaching of swimming ascents but now require it as part of certification.

Which method is best? Frankly, there is no such thing as the "best method" for self rescue. Each has been time tested and proven to save lives. Each offers advantages under differing circumstances.

The important point here is that every diver should be fully trained and proficient in *all* self rescue methods available. Arguing about the theoretical advantages of one method over another will not solve the problem—if and when it occurs. The more you know, the better your chances for survival.

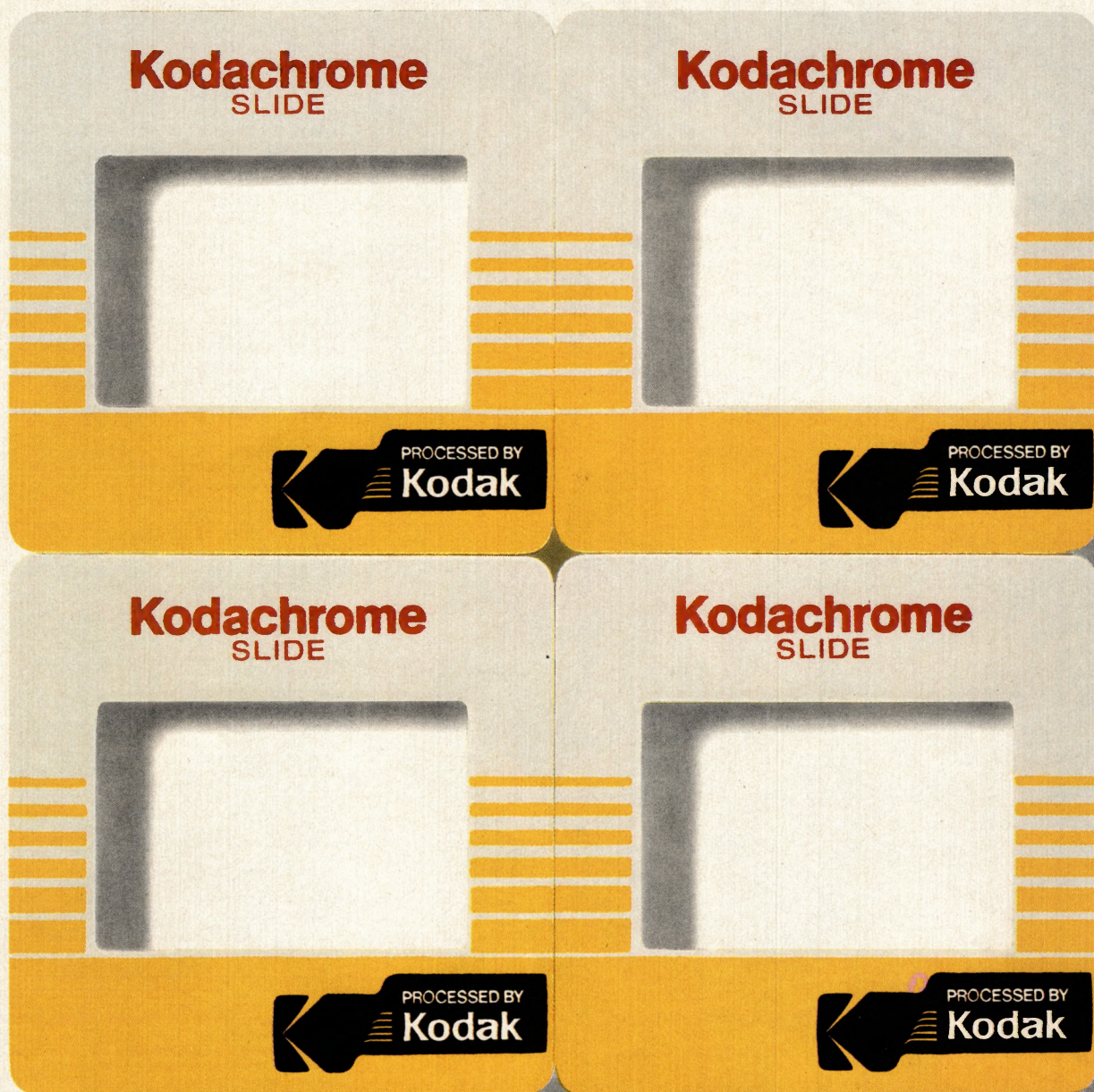
If you did not obtain training (during your basic class) in all available methods of self rescue, perhaps it is time to learn about them now. This is especially true if you are not aware of the latest techniques for emergency swimming ascents. 

In previous editorials we have discussed the need for inner strength in diving. While the buddy system is an excellent concept, there is danger in becoming overly dependent on your buddy. Every diver should plan and carefully monitor his/her own dives as a safety hedge against the possibility of becoming separated from a partner. And one of the basic building blocks of the self-reliance concept is self rescue, the ability to extricate yourself from an underwater emergency—such as running out of air.

In a basic scuba class, divers are taught the best way to avoid an out-of-air emergency is to never run out of air. Instructors stress the importance of constantly monitoring the submersible pressure gauge and returning to the beach or dive boat with at least 500 psi remaining in the tank. While this technique is absolutely correct, divers should not be lulled into a false sense of security. Prevention is only half the answer.

Make no mistake about it—divers *do* run out of air. In fact, out-of-air emergencies may well be one of the most common emergency events in sport diving today. Why does this happen? There are a variety of causes but basically it boils down to this: Humans are not infallible. Diver error accounts for an estimated 99 percent of all out-of-air events.

Miscalculation is perhaps the greatest cause of out-of-air events. It is virtually impossible for a diver to precisely plan a dive he has never made before. There are just too many variables that cannot be predicted nor included in the dive plan. The diver may range too far from the boat or beach. He may encounter un-



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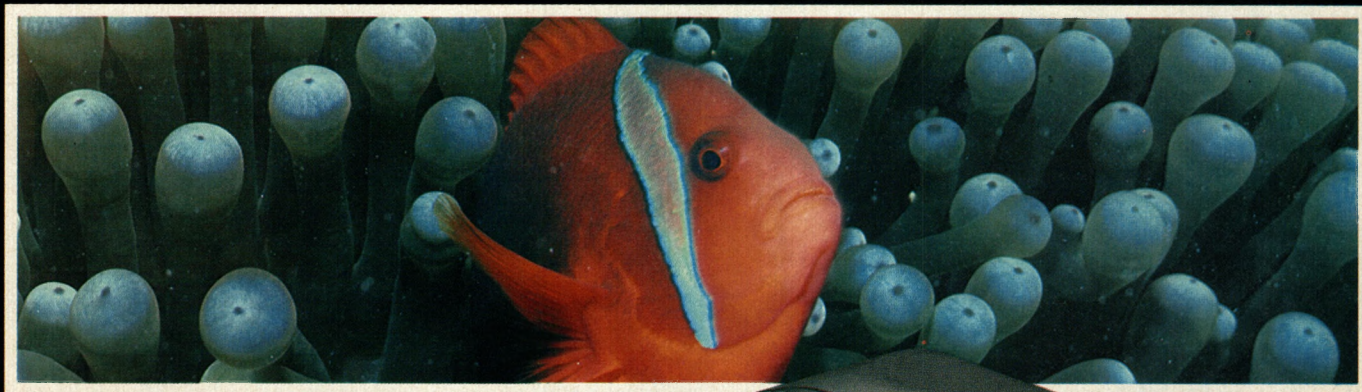
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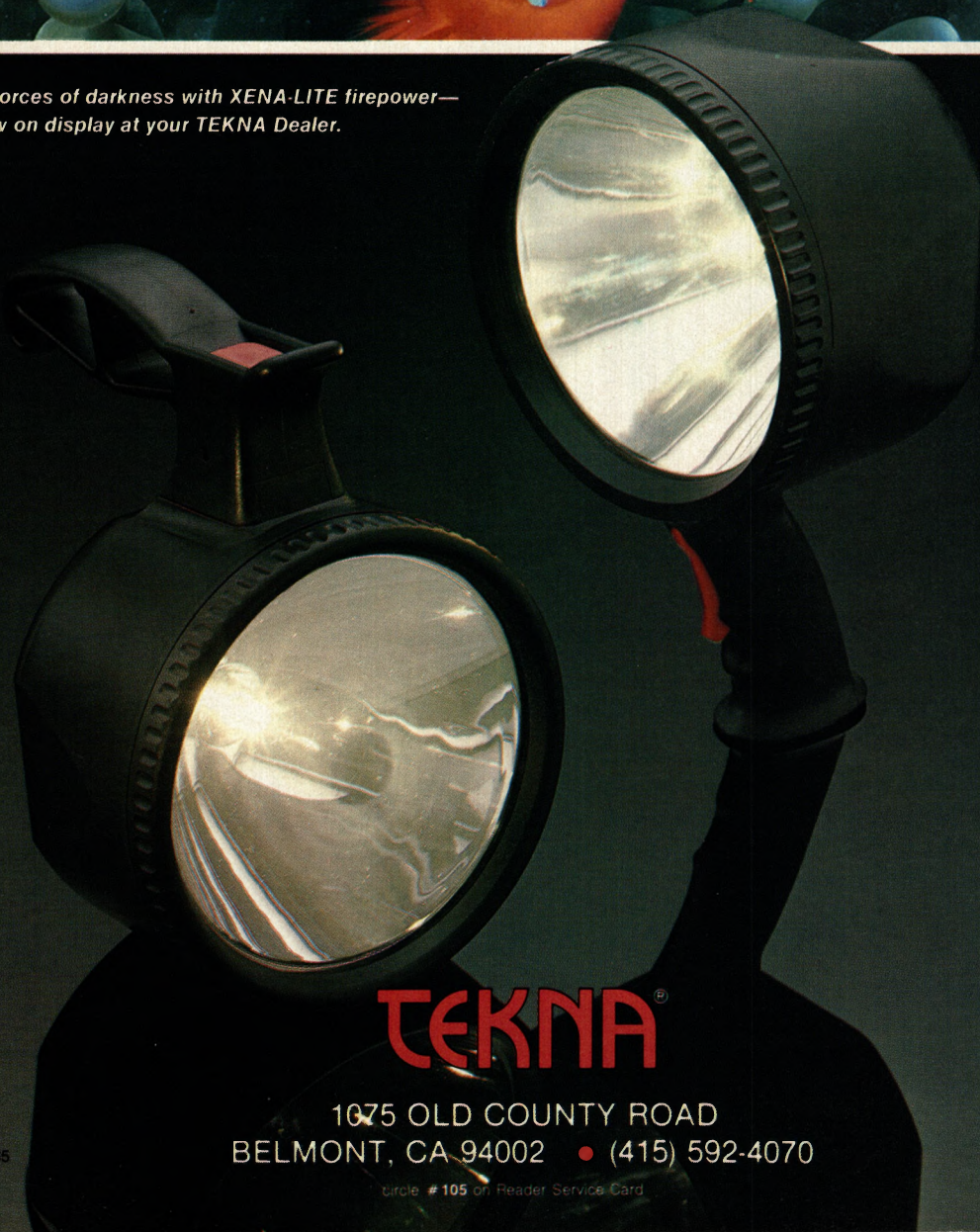
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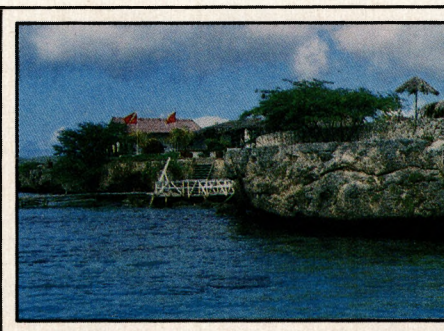
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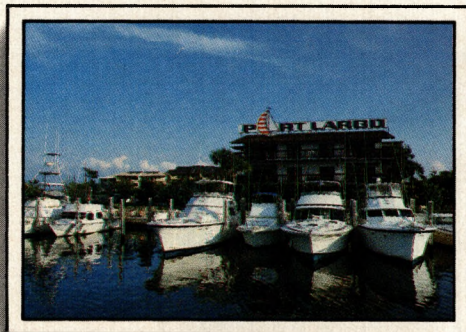
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Scuba Quiz

Category: Equipment

Topic: Wetsuits

By Dennis Graver

Wetsuits are familiar exposure garments to divers, but with so many styles, thicknesses and configurations, it helps to have a good understanding of what they are supposed to do, how they should be used, how to care for them, etc. See if you are as well versed on wetsuits as you should be by trying to answer this month's questions correctly. The answers are on the following page.

1. A wetsuit reduces heat loss from the body by:

- ☐ A. Placing insulation between the body and the cold water
- ☐ B. A thin layer of warm, trapped water between body and suit
- ☐ C. Reflecting body heat back to the diver
- ☐ D. None of the above

2. During descent, a wetsuit _____, buoyancy is _____ and insulation is _____.

- ☐ A. Expands, increased, increased
- ☐ B. Compresses, decreased, decreased
- ☐ C. Compresses, increased, increased
- ☐ D. None of the above

3. Arrange the suit configurations in order from the one retaining the least heat to the one retaining the most heat.

- ☐ A. Farmer john pants with standard three zipper jacket and coldwater hood
- ☐ B. One piece jumpsuit with coldwater hood
- ☐ C. Farmer john pants with zipperless pull-over jacket with attached hood
- ☐ D. High waisted pants, hooded vest and single zipper jacket

4. True or false. A shirt worn under a wetsuit can help reduce heat loss.

- ☐ A. True
- ☐ B. False

5. The tops of wetsuit boots should be worn _____ the legs of wetsuit pants.

- ☐ A. Inside
- ☐ B. Outside
- ☐ C. Inside or outside
- ☐ D. All of the above

6. Which of the following practices are recommended for the care of wetsuits? (Select all correct answers.)

- ☐ A. Rinse in clean, fresh water after use
- ☐ B. Dry in the sun
- ☐ C. Store on a wide hanger
- ☐ D. Oil zippers frequently

7. True or false. Physiologically, there is no difference between wearing a wetsuit and wearing a drysuit.

- ☐ A. True
- ☐ B. False

8. Which of the following wetsuit features is least desirable?

- ☐ A. Knee pads
- ☐ B. Spine pad
- ☐ C. External bellows pocket
- ☐ D. Key pocket

9. Wetsuits are easy to repair and can be used within _____ after being repaired, but it is best to wait _____ before using a suit after it has been repaired.

- ☐ A. Sixty minutes, eight hours
- ☐ B. Ten minutes, one hour
- ☐ C. Ten minutes, eight hours

10. Which of the following statements is incorrect?

- ☐ A. Three fingered mitts are warmer than five fingered gloves because the mitts have less surface area
- ☐ B. Buoyancy loss in a wetsuit can be as much as 10 pounds at a depth of 100 feet
- ☐ C. Use of a compensating weightbelt is a good safety practice when a wetsuit is worn
- ☐ D. A suit with a nylon exterior is warmer at the surface between dives than one without the nylon covering

Scuba Quiz

Answers: Wetsuits

1. A. Placing insulation between the body and the cold water. Water does get into a wetsuit, and the water is quickly warmed; but the gas bubbles in the suit insulate the diver, not the water inside the suit. The less water inside the suit, the warmer you will be. That's why proper fit of a wetsuit is so important. Water that gets in can get out, carrying heat with it.

2. B. Compresses, decreased, decreased. The bubbles inside the wetsuit material obey Boyle's Law, compressing under pressure. This reduces the volume of the suit, so less water is displaced. As the volume is reduced, the suit becomes thinner, and insulation is decreased as well. You can see why deep diving in cold water in a wetsuit is not a good idea.

3. B, D, A, C. Three factors to keep in mind when warmth is of primary concern are suit thickness, layers of material and the number of zippers. Layers of material reduce water circulation through a suit, as do fewer, smaller zippers. A suit with layers of insulation also allows flexibility for use in different temperatures.

4. A. True. If a wetsuit jacket does not fit perfectly, wearing a T-shirt underneath it can help reduce the circulation of water and decrease heat loss. A thin neoprene vest is even more effective, but should only be used if the jacket will permit the added bulk without restricting breathing severely.

5. A. Inside. If the tops of the boots are worn outside the legs of the wetsuit pants, several problems result. The drag is greater, swimming motions pump warm water from the boots and draw in cold water, and the water in the suit drains into the boots upon exiting from a dive. Look better and dive better with your boots inside the legs of your pants.

6. A and C. Rinse in clean, fresh water after use and store on a wide hanger. Although frequently seen, the drying of wetsuits in the sun is not good for them. Zippers need frequent lubrication, but never with oil, which is harmful to the suit material. To prolong the life of your suit, read and follow the manufacturer's instructions.

7. B. False. The wearing of a wetsuit alters respiration and circulation to a much greater extent than a drysuit and the effects of these differences are manifested in many ways once a diver enters the water. This does not mean that drysuits are always preferred over wetsuits. It does mean that you need to be aware of the effects of breathing restriction, blood shunting, etc., that occur when a wetsuit is used.

8. C. External bellows pocket. Knee pads extend the life of the suit, a spine pad reduces water circulation and a key pocket is handy. An external pocket, however, increases resistance to movement through the water. If you plan to do much swimming, this type of pocket may not be desirable.

9. C. Ten minutes, eight hours. A wetsuit can be repaired and used quickly if necessary, but the welding effect of the gluing of the material will be more complete if the repair can sit undisturbed overnight. Be sure to read and follow the instructions for the repair of your suit so you can get the best possible results.

10. D. A suit with a nylon exterior is warmer at the surface between dives than one without the nylon covering. This is incorrect. The wet nylon acts as an evaporative cooler. Even though the neoprene is an insulator, heat loss from a diver will be greater than if the suit does not have an exterior covering. The covering increases the strength and life of the suit, though, so it is desirable. Just be aware of the cooling process.

I have focused on some of the details of wetsuits, but this type of practical information is often difficult to acquire except through the school of experience. If you have graduated from this institution, congratulations on your high score. If the quiz was educational for you, perhaps you will benefit from the experience of others. Experience, coupled with continuing education, produces the finest possible divers. I commend you on your desire to become one.

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Wreck Facts



BY ELLSWORTH BOYD

Thanks to Dave Gentry, Van Nuys, California, for sending the story about the SS *Michigan*, a boat with more lives than a cat. A former mackerel fishing vessel converted to a party boat, the good ship *Michigan* has sunk nine times in 43 years! Gentry says: "This is not a fishing party boat; this is an honest to goodness 'party' boat that cruises Newport Bay, California, with an assemblage of passengers who want to have a good time."

Times have been good—so good that the *Michigan* was voted best party boat at the annual Character Boat Parade sponsored by the Commodores Club in the early '60s. That's when the *Michigan* was sunk by a beer can! A crewman aboard the *Michigan* called for a beer from a neighboring party boat filled with collegians. Rather than pull in close and toss the beer aboard, the collegians loaded a can into a small cannon, the kind fired at football games after a touchdown. Using a half-charge of black powder, they loaded and fired. The half-charge was stronger than anticipated and the can of beer blew a hole in the side of the *Michigan*, sinking her for the fourth time. Everybody abandoned the ship, joined the collegians and toasted the demise of

the old mackerel vessel.

Like the fabled phoenix that rose from its ashes to fly again through another life cycle, the *Michigan* was soon raised and led the Character Boat Parade for many more years. Her sinkings entailed two crashes in Balboa Bay, one into the jetty and another into the Balboa Bay Club; she went under at Woody's Wharf; sank next to the defunct Berkshire Restaurant; was swamped during a Christmas Lights Parade; sank near the Rusty Pelican restaurant; and ran into a dock.

The irony of it all is that two divers, Dick Shaw and Virgil Parch—who were both cartoonists—first raised the sunken *Michigan* from beneath Lido Bridge in the late '40s. Her escapades would have been more than enough for a continuous cartoon strip. She even had a run-in with the Russians. Once, when a Russian trawler edged near shore, the *Michigan* stormed out to sea to confront the Soviets. Flabbergasted by a wild bunch of beer drinkers, the Russians radioed for help and the U.S. Coast Guard intervened. "We were only going to offer them a beer," a passenger aboard the *Michigan* said. "You don't think we'd be dumb enough to take on the Russians?"

NAVIGATIONAL BLUNDER

One of the most incredible navigational blunders in naval history is recorded in a book, *Course 095 to Eternity*, by Elwyn E. Overshiner. On the evening of September 8, 1923, the U.S. Navy's 11th Destroyer Squadron, Pacific Battle Fleet, crashed on the rocky promontory of Point Pedernales (known as Honda by the California Wreck Divers), off the Southern California coast. Seven destroyers were lost, 23 men died and many were injured. Natives of the small town of Lompoc, who aided the victims that infamous night, call it "the Navy's greatest peacetime disaster."

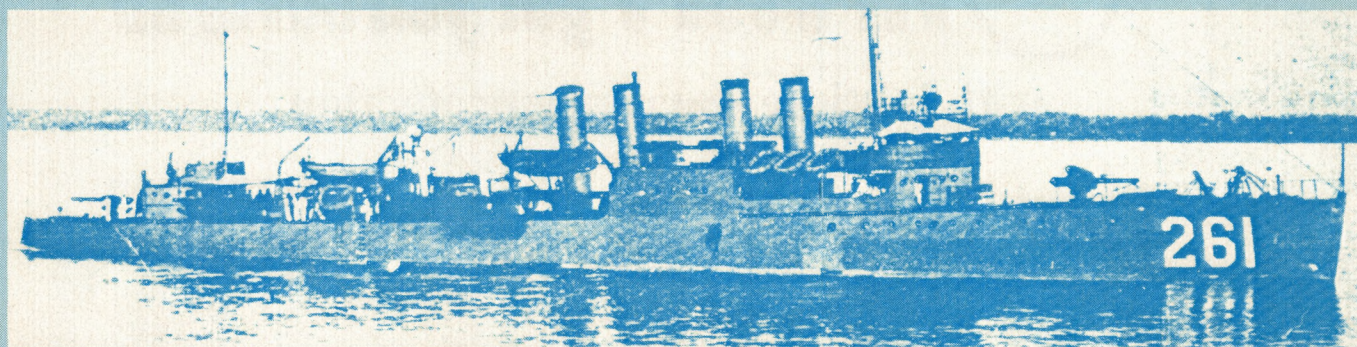
Elwyn Overshiner, now deceased, spent years researching government records. He used the Freedom of Information Act to reveal a Navy cover-up, writing a documented, true account of what really happened to Destroyer Squadron 11. Course 095 was erroneous dead reckoning that accounted for more sunken ships than were lost in all of World War I. Rusting hulks on shore and in the sea are all that remain more than 60 years after the tragic demise of the USS *Delphy*, *Fuller*, *Woodbury*, *Nicholas*, *Chauncey*, *Young*, and *S.P. Lee*.

The author's widow, Mrs. Camille M. Overshiner, has a small supply of her husband's book, which was published in 1980. A 220 page paperback, *Course 095 to Eternity* has 15 dramatic photos of the destroyer squadron. The book is \$6.25 including postage. Order it from Mrs. Overshiner, 92 Buckwood Place, Santa Rosa, CA 95405.

Bill Traugher, Nashville, Tennessee, and Jack Cravey, Sylvester, Georgia, ask about the *Empire Mica*, a British tanker torpedoed by a German U-boat in 1942 off the Florida Panhandle. The 465 foot long tanker was built in Howeston-on-Tee, England, in 1941 and leased to the Anglo-American Oil Company. In June 1942 the *Empire Mica* was loaded with 11,200 tons of petroleum distillate in Baytown, Texas, and was heading for Key West, Florida, on her maiden voyage for the oil company.

Submarine sightings had been reported, but the huge tanker was unable to anchor in St. Andrews or St. Joseph's Bay for the night because she drew too much water. On a calm, moonlit night, she was spotted by the captain of the U-67 who

(Continued on Page 28)



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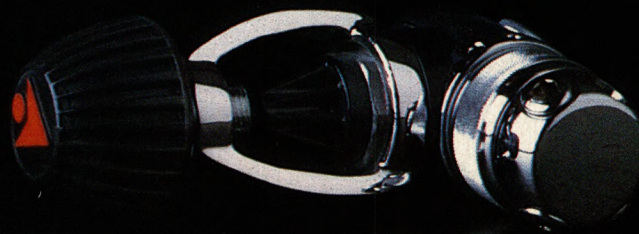
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DIVING MEDICINE

BY ALFRED A. BOVE, M.D., PH.D.

You might wonder why we are discussing helium in a column on diving medicine. Although we do not encounter helium in sport diving, this gas is used extensively in commercial diving because it prevents narcosis. Divers working below 250 feet can be incapacitated by nitrogen narcosis, but with helium there is no narcosis at all. From my Navy training, I remember well the 285 foot air dive where we were supposed to perform simple manual tasks. These were impossible to complete because of nitrogen narcosis. A week later, when we repeated the same dive on helium-oxygen, our thoughts were clear, manual dexterity was normal and the tasks were easily done.

Helium diving is a major advance that has allowed divers to break the narcosis barrier and descend to very deep depths. It is quite common to find divers working at 600-800 feet in the open sea and there are occasional working dives to 1,200-1,500 feet. Record experimental dives have reached over 2,000 feet in pressure chamber experiments using specially trained deep divers, breathing helium-oxygen mixtures.

Helium is an interesting gas for many reasons. It is present in minute quantities in air (about one part in 200,000) and often is found in large quantities in natural gas tapped from underground sources. For many years, helium from oil wells was discarded, but today, with heavy demands for helium by the diving industry, most of it is recovered. Helium is the second lightest element; only hydrogen is lighter. Helium, enormously abundant in the sun, is produced by the fusion of four hydrogen atoms in this great nuclear furnace. Although we do not benefit directly from the sun's helium, we rely on the energy produced in the fusion reaction for almost all our energy needs on earth.

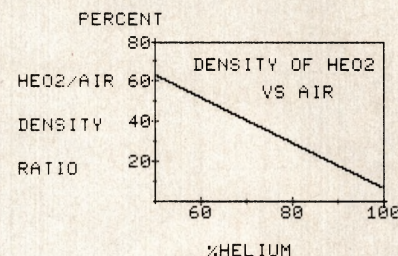
The buoyancy of helium in air is not the reason it is used in diving. We have learned that helium's very low capacity for dissolving in body tissues reduces its narcosis action. This feature makes it an important diving gas when mixed with oxygen in the correct proportions. In deep diving, the amount of oxygen added to helium can be quite small. Usually oxygen is kept at a constant partial pressure of about one-half atmosphere. At 1,000 feet, where the pressure is about 460 psi,

oxygen is about one percent of the mixture; the other 99 percent is helium. There is little room for error in mixing breathing gases for these depths.

Decompression tables for helium are different than air tables, and because helium and oxygen are mixed in different proportions, the tables are not only depth dependent, but vary with the amount of oxygen in the mix. Deep diving is usually done using saturation procedures where divers remain under pressure for many days breathing helium-oxygen. Decompression from saturation requires many days, and during the slow ascent, the breathing mixture is changed to provide the proper amount of oxygen. Like nitro-

created unique new problems in diving. A rapid loss of body heat occurs from the high heat conductivity of helium. The problem is severe enough that the breathing gas must be heated at depths below 500 feet; otherwise, the diver will freeze from within as heat is lost by exhaling. Its small molecular size also makes helium diffuse through many materials that easily exclude air. In early diving, electronic circuits malfunctioned because helium leaked into airtight vacuum tubes. Diffusion through hoses can also be a problem. Special care is necessary to avoid helium diffusion into electronic equipment and other machinery.

Finally, divers breathing helium-oxygen



Examples of No Decompression Limits
For Helium-Oxygen and Air

DEPTH (Feet)	AIR (Minutes)	HEO ₂ (Minutes)
100	25	35
120	15	25
140	10	15

Helium-oxygen mixtures allow divers to have greater bottom time without decompression. The higher the percentage of helium in the gas mixture, the less dense it is.

gen, helium can produce decompression sickness (bends) if proper procedures are not followed.

Because of differences in gas properties, divers' voices change when breathing helium-oxygen mixtures. The characteristic Donald Duck voice of the helium diver is well known, and although some humor is always derived from the voice change, there is a serious problem in voice communications with helium breathing divers. Electronic unscramblers have been devised that restore the voice of a helium diver to normal.

Although helium has opened the deep oceans to manned operations, it has also

very deep (1,000 feet and deeper) sometimes develop tremors because of a complex interaction between pressure and helium in brain cells. This effect can be countered by adding small amounts of nitrogen to the breathing gas.

It is unlikely that you, as a sport diver, will do helium-oxygen diving, but the next time you see helium balloons swaying in the wind, remember that divers deep in the sea are using the same gas to stay alert and functional at those depths.

Note: Helium used to fill balloons contains no oxygen. Breathing it for the voice changes it creates can rapidly produce unconsciousness.



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Film Festivals 'n Symposiums

GREAT LAKES PROGRAM

Shipwrecks and Scuba in the Great Lakes, an annual dinner program sponsored by the Bay Area Divers, will be held November 16. It will feature Frederick Stonehouse, who has published seven books and numerous articles on shipping disasters and lost ships. He is a partner in Sonar Search Associates, which specializes in location of lost wrecks in the Great Lakes.

Presenting *The Wreck of the Edmund Fitzgerald* on the 10th anniversary of the sinking of the giant 729 foot laker with all 29 hands, Stonehouse will reveal a great number of incredible errors that were never brought to the public eye. Based on his book of the same title, this program will provide a close examination of the tragic November loss.

Offered in Vermilion, Ohio, just two blocks from the Great Lakes Historical Society, the program is a sell-out every year. Tickets for the combined dinner program are \$15.

For more information or tickets, contact: Joyce Hayward, President, Bay Area Divers, 1791 C.R. 296, Bellevue, Ohio 44811; (419) 483-3074.

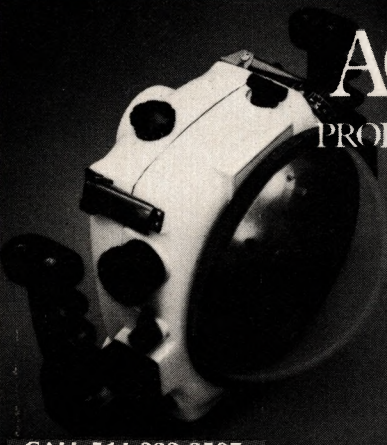
IQ85/DIVERS DAY

Two programs, the International Conference on Underwater Education, 1985, sponsored by NAUI, and Divers Day, will take place in November at the Town and Country Hotel in San Diego, California.

IQ85, November 21-23, will have seminars, exhibits and socials. This conference is designed for diving leaders, instructors, assistant instructors, divemasters and advanced divers from any agency. IQ85 will host over 80 speakers who will cover a variety of topics, such as diving medicine, exotic dive destinations, underwater photography, marine environment, diver rescue, teaching techniques, the business of diving and more. Some of the featured speakers include Dr. Sylvia Earle, Dr. Eugenie Clark, Howard Hall, Marty Snyderman, Walt Hendrick, Sr., Dennis Graver, Dr. Art Bachrach, Dr. Glen Egstrom, Dr. Fred Bove, Bob Wohlers, Dickie Walls, Jon Hardy and E.R. Cross.

Besides presentations by the speakers, there will be 60 exhibits by diving equipment manufacturers. Socials, luncheons and a special NAUI Silver Anniversary Dinner Dance are planned.

Divers Day, November 23, is a program for the sport diver (from any certification agency) and the interested non-diver. A special set of seminars will be



AQUATICA 3

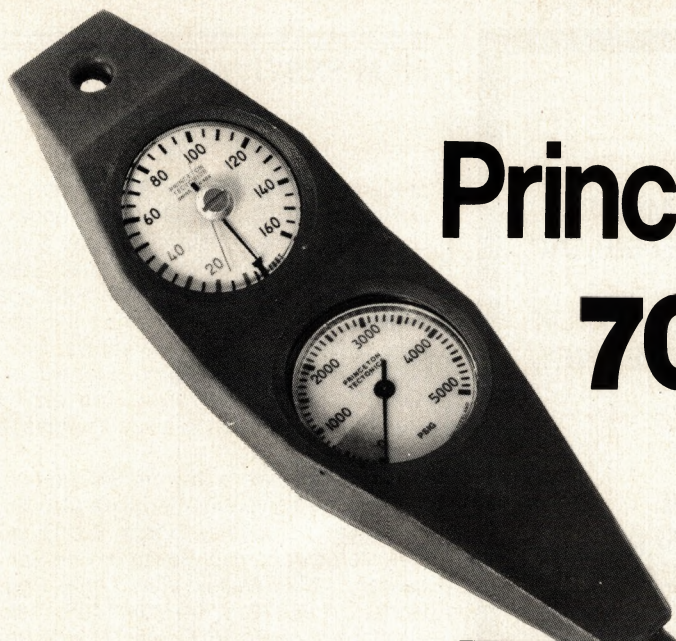
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**TEXT AND PHOTOGRAPHY
BY GERI MURPHY**

Prininceton Tectonics, well known for its Bottom Timer and Bottom Light, now introduces a family of diving instruments. There is a depth gauge (DG-5), a pressure gauge (PG-2) and a combination console (PTC-700). The console combines the best of two worlds into a compact instrument.

The twist with Princeton Tectonics' new gauge line is that these instruments are Swiss made. Those little old watchmakers in the Alps have been busy! The supplier has developed a reliable, accurate and rugged pair of gauges.

Princeton's PTC-700 console looks different than most. It has a futuristic design that makes you wonder if Captain Kirk is planning to use it on his next trek into space. The console features a double taper design. The manufacturer claims it will slice through water with minimum drag. Perhaps the most fascinating aspect of the console is its curved back. This ergonomic feature allows the console to fit comfortably into a diver's hand.

One thing is for sure—the PTC-700 console is certainly rugged. It weighs approximately 1.7 pounds and feels very solid. The console is a one piece solid rubber molded housing with plenty of material protecting each gauge. A three-eighths inch diameter hole at the top allows the user to attach a line or snap clip for hooking it onto a tank strap. The console is available in two colors, basic black or medium blue.

As for the instruments contained in the console, they appear equally sturdy. The depth gauge is an oil filled bourdon tube



Princeton Tectonics' PTC-700 console holds the DG-5 depth gauge and PG-2 submersible pressure gauge. It has a futuristic shape with twin taper and curved back to allow easy reading of the instruments and to fit comfortably in the hand.

type with a maximum depth indicator and a reset dial. Two depth ranges are available—either 0 to 160 feet or 0 to 260 feet. I personally prefer the 0 to 160 foot gauge, as it offers greater accuracy at shallow depths.

The dial face is luminous with black numbers and tick marks. The shallow depth quadrant has red numbers and tick marks from 10 to 40 feet, indicating the typical decompression stops. The needle indicator is black and the maximum depth needle is red. Both stand out in good contrast against the creamy yellow luminous dial face. The depth gauge is available with or without the max depth indicator. This feature costs about \$10 more and is worth it.

The entire depth gauge is enclosed in an impact resistant thermoplastic housing that is ultrasonically welded. There is a plug on the backside for adding oil if air bubbles ever form in the gauge.

The other half of the console is a rugged looking submersible pressure gauge that features a range from 0 to 5,000 psi.

As with the depth gauge, the PG-2 pressure gauge is encased in a high impact thermoplastic housing that is welded closed. Inside is a high quality, spiral wound bourdon tube. This mechanism assures smooth indicator needle action since there are no gears in the linkage.

The dial face of the PG-2 is also luminous and features black numbers and tick marks against a creamy yellow background. A small section of the dial face is screened in red, indicating the low air zone from 700 psi to zero. The console can be ordered with a high pressure hose having either three-eighths inch, seven-sixteenths inch or metric threads. It will fit all U.S. or imported regulators.

Our test of the PTC-700 console proved quite satisfactory. The console is indeed rugged and the gauges are very accurate. The best news is the price. The PTC-700 sells for \$131, \$141 with the maximum depth indicator gauge.

For information see your Princeton Tectonics dealer or contact the company at P.O. Box 8057, Trenton, NJ 08650.

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FILM FESTIVALS

presented. Some of the speakers include Jim and Cathy Church, Jack McKenney, Dr. Dick Murphy from the Cousteau Society, Dr. Sylvia Earle, Eric Hanauer, Stan Strauss, Bob Justice, Paul Tzimoulis and more. The presentations may include films or synchronized slide shows. Bubble blowing sessions in the pool will be available for the non-diver. The exhibit area for IQ85 is open to all participants of Divers Day.

Tickets for Divers Day are \$5 and tickets for the Anniversary Party are also \$5. These can be purchased from San Diego dive stores or contact Susan or Ron Bangasser, 12724 Valley View Lane, Redlands, CA 92373; (714) 794-4495. Tickets at the door are \$6. Contact Ron or Susan Bangasser for information on, or registration for, IQ85 as well. For travel arrangements and hotel accommodations, contact Westaire Campus Travel, (800) 682-4200 or (800) 221-7135 (CA), or (714) 854-1800.

BENEATH THE SEA PHOTO CONTEST PRIZE

Sponsors of the Beneath The Sea Underwater Photo Competition will award an exciting best-in-show prize—a four day dive vacation for two at the new Brac Reef Beach Hotel on Cayman Brac. The prize, courtesy of the Cayman Islands Department of Tourism, also includes airfare from Miami.

The contest is open to diver-photographers in New England and Mid-Atlantic states and will feature many other awards and prizes, including equipment from major manufacturers. Slides may be entered in several categories, including ones of special interest to divers in northern fresh or salt water.

Winners of the contest will be honored at the Saturday evening film festival of the 10th annual Greater New York Underwater Exposition, March 21-23, 1986, at the Marriott Hotel in Tarrytown, New York.

The closing date for contest entries is January 31. For a copy of the rules and entry blank, send a self-addressed, stamped envelope to: R.A. Jacobson, 305 E. 86th St. (2T), New York, NY 10028.

SEA RAY PHONE NUMBER

The toll free telephone number listed in the September SDM for Sea Ray (wetsuits) was incorrect. The correct number is (800) 645-5554.

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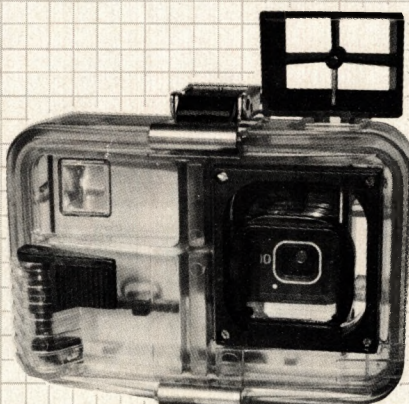
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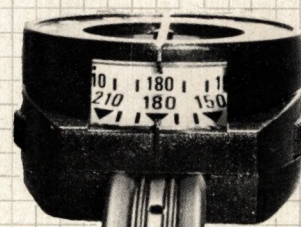
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SEA ANEMONES OF THE PACIFIC NORTHWEST



Top: An attractive red *Tealia* anemone. Above: Nancy Theune examines a huge *Tealia*.

Puget Sound Reveals Its Undersea Roses

TEXT AND PHOTOGRAPHY
BY MARK D. THEUNE

I recall standing on the passenger deck of the Washington State ferry, *Illahée*, on a gray, rainy day and gazing below at the edge of another world where time appeared to have been frozen at midnight. This was my first topside view of the dark waters of Puget Sound, more than seven years ago. It reminded me of the cold, murky waters of Lake Michigan and the Wisconsin lakes where I first developed an addiction for scuba diving. I expected my first sub-sound excursion would reveal to me basically the same rather colorless features I had explored when diving the Great Lakes. However, waiting for

me in these cold Pacific Northwest waters was an exciting and unexpected surprise. Beneath the surface of Puget Sound, the Strait of Juan de Fuca, the San Juan Islands and the Canadian Gulf Islands is a variety of brilliantly colorful sea anemones.

Anemones are members of the phylum Cnidaria, which also includes jellyfish, corals, gorgonians and hydroids. Cnidaria is derived from the Greek word *knide*, which means nettle. The fact that all members of this phylum contain stinging cells explains the origin of the term. The structure of all cnidarians includes a

mouth, a simple digestive cavity and primitive type of nervous system. Additionally, cnidarians, unlike less complex sea creatures such as sponges, have a common, radially symmetrical design.

The anatomy of the sea anemone is fairly simple. It consists of a pedal disk at its base, used to attach itself to rocks, pilings or any other stationary object, including manmade structures such as shipwrecks. The pedal disk enables the anemone to station itself in areas where there are strong currents or heavy surf, thereby permitting it to feed on nutrients and floating microorganisms that pass



Backlit by an underwater strobe, a *Metridium* anemone glows like a sci-fi special effect.

by. Because the continual flow of water is a prerequisite to the anemone's survival, the scuba diver will find few anemones in bays and inlets where the movement and exchange of water is greatly reduced.

Extending from the anemone's pedal disk is a column that consists of a tough outer layer (epidermis), a middle layer (mesoglea) and a soft inner layer (gastrodermis). The length of the column can be as much as two and one-half feet in the case of the *Metridium* or sun anemone.

At the top of the column is an oral disk bearing a slit-like mouth, surrounded by one or more rows of tentacles that gently sway with the water current. Within the tentacles are stored minute stinging cells, called nematocysts. These consist of explosive capsules that erupt when stimulated, extending a long, stinging or entangling thread. Since a nematocyst can be discharged only once, the anemone must constantly produce new nematocysts to replace used ones. If a small creature is foolish enough to brush against the anemone's tentacles, it is quickly rendered defenseless by the paralyzing effects of the nematocysts. The poisonous barbs contained within the stinging cells permit the anemone to draw the captured prey to its mouth.

The sea anemone employs several defense mechanisms to ward off predators.

In addition to use of its stinging tentacles, it will also protect itself by withdrawing its tentacles and mouth into itself to form a compact ball. The slightest touch of a diver's hand or even the movement of water caused by the kick of a fin will trigger this defensive reaction. A few types of anemones will gyrate back and forth and slowly move away when danger is present.

Anemones reproduce both sexually and asexually. When an anemone reproduces sexually it releases the eggs and sperm into the water through its mouth. Those that reproduce by this method tend to be larger and are often found living as solitary creatures. When multiplying asexually, the anemone merely divides itself in two or may even throw off pieces of its pedal disk (called pedal laceration), which will then develop into smaller anemones. Those that reproduce by this method, such as the pink-tipped green anemone (*Anthopleura elegantissima*), are usually found in tightly packed groups and can often be seen clinging to exposed rocks during low tide. At such times, the anemone will withdraw into itself to preserve its inner moisture until it is again covered by the incoming tide. Studies have shown that the pink-tipped green anemone is fairly aggressive and will use its nematocysts to attack and even kill anemones from other colonies.

These anemone "wars" eventually result in recognizable neutral zones forming lines between the different colonies.

The anemone most familiar to the Pacific Northwest scuba diver is the sun anemone (*Metridium senile*), the largest of the sound anemones. It may grow to 18 inches (46 cm) in height, with an oral disk reaching up to nine inches (23 cm) in diameter. These graceful creatures are most often found clustered on underwater pilings, cliffs and shipwrecks and range in color from white to shades of orange and yellow.

When illuminated by the dancing shafts of sunlight filtering through the water on a sunny day, the brilliant hue of the giant green anemone (*Anthopleura xanthogrammica*) presents a breathtaking vision. The bluish-green color is caused by the presence of algae that live within the anemone's tissues. The green anemone is fairly large, with an oral disk stretching up to ten inches (25 cm) in diameter.

The reddish-brown moonglow, or buried sea anemone (*Anthopleura artemisia*), is commonly found in sandy areas away from rocky shallows. Its column is usually buried in the sand with only its long, slender crown of tentacles exposed. While cruising just off the bottom with camera and strobe in hand, I have often come across a single moonglow appearing as an oasis of color in a desert of gray sand.

The delicate pink/crimson anemone (*Cribrinopsis fernaldi*) is one of the most beautiful of the Pacific Northwest anemones. Its slender tentacles are marked by pale red, scar-like markings that give it a lovely textured appearance. It thrives in swift currents and can be found clinging to rocks in the Strait of Juan de Fuca and in the Canadian Gulf Islands.

My favorite Pacific Northwest sea anemone is the *Tealia peruviana*. Its oral disk reaches up to eight inches (20 cm) in diameter and it is most commonly found in northern Puget Sound and the Strait of Juan de Fuca, attached to rocks in as deep as 100 feet of water. Rose anemones have a beautiful red column with white or red tentacles often surrounding a golden yellow oral disk. This latter often has red stripes extending from the center to its outer edges. The rose anemone feeds on fish as well as other creatures that may wander into its stinging tentacles.

The beautiful colors and designs of the Pacific Northwest anemones seem limitless and continue to give me reason for enduring the frigid 48°F Puget Sound waters. Of all the marine subjects in my photographic library, it is the anemones that bring the most "oohs" and "aahs" from non-diving friends. Until they see my photos, they harbor the same misconception I had seven years ago—beneath the surface of Puget Sound there exists only a dark and colorless world. 

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Diver's Calendar

November 9 Fourteenth Annual Inward to the Sea underwater festival, downtown Washington, D.C. Daytime seminars (\$7), evening film festival (\$7)—hosted by Stan Waterman. (Contact: Inward to the Sea, P.O. Box 17502, Washington, D.C. 20041-0502; (703) 938-5325)

November 9 Fifth Annual Great Lakes Wreck Film Festival, presented by the Buccaneer's Scuba Club at Thomas Moore High School Auditorium, Milwaukee, WI. Featured guests are John Steele and Frederick Stonehouse. (Contact: Brian Black, 3901 South Clover Dr., New Berlin, WI 53151; (414) 784-4174)

November 14-17 Sea Ventures Expo, Los Angeles Convention Center. Films, fashion shows and seminars for all watersports. (Contact: (213) 316-6140)

November 14-21 NAUI Dives Hawaii continuing education seminars for instructors, assistant instructors and dive-masters—on Oahu, Maui, Kauai and Hawaii. (Contact: Ron and Susan Bangasser, 12724 Valley View Lane, Redlands, CA 92373; (714) 794-4495)

November 16 Shipwrecks and Scuba in the Great Lakes, a dinner program offered by the Bay Area Divers, will be held in Vermilion, Ohio. Frederick Stonehouse will present *The Wreck of the Edmund Fitzgerald*. Tickets are \$15. (Contact: Joyce Hayward, President, Bay Area Divers, 1791 C.R. 296, Bellevue, OH 44811; (419) 483-3074)

November 21-23 International Conference on Underwater Education 1985 (IQ85), at the Town and Country Hotel, San Diego California. Presentations, exhibits, seminars, training programs and parties. (Contact: Ron and Susan Bangasser, 12724 Valley View Lane, Redlands, CA 92373; (714) 794-4495)

January 23-26 Annual Shell Show, sponsored by the Greater Miami Shell Club, Inc., in the lobby of Planet Ocean. (Contact: Sandra Gayle Motes, 4525 W. 20th Ave., C524, Hialeah, FL 33012)



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ISLAND STYLE

Caribbean Answer To Escargot

TEXT AND PHOTOGRAPHY
BY GREG JOHNSTON



When was the last time you held a conch shell to your ear and heard the ocean? It probably has been awhile, but, like the sounds of the sea, the conch has been part of the heritage of the Florida Keys for generations.

The Indians first called the conch *lam-bi*. The early Spanish explorers called it *concha*, while the French settlers called it *conque*. The French version of the name may explain why it is so often pronounced "konk" in English.

The history of the conch, and how it became the symbol of the people of the Florida Keys, is an interesting story:

During the American Revolutionary War, many British loyalists returned to England rather than fight against their mother country. Many others found refuge in the Bahamas. Soon after the war, small groups of English settlers left the Bahamas, returning to colonize the Florida Keys.

In 1783, Spain regained the land called Florida, forcing many of the settlers to return to the Bahamas. The more rugged remained. These people would soon become known as "Conchs." They lived by the sea, worked on the sea and ate the products from the sea—including conch.

The conch shell was the natural signal and ceremonial horn used by all historical cultures having access to the shells. Bahamian fishermen, as well as the Conchs, often used the shell to announce their return from the sea. The conch was an important part of their diet. They made it into chowder, fritters, salad and stew.



The queen conch (*Strombus gigas*) has been an important part of the diet of people in the Caribbean throughout history. Easy to capture, the animal's population has been reduced to the point where it is now illegal to collect them in Florida waters. Scientists are studying methods to increase their numbers, including conch farming. Top: Kathryn Johnston catches conchs in a grassy bed. Above: Conch fritters and chowder. Right: Cutting into a fritter. Opposite page: Tenderizing conch.



Conchs, the marine animals, are mollusks. They belong to the class Gastropoda. There are many species, which include the fighting, rooster-tail, milk and several others. The queen conch (*Strombus gigas*), or pink conch as it is sometimes called, is the only edible species. The beautiful shell of the queen conch can be found abundantly throughout the Bahamas and many other parts of the Caribbean, including the Florida Keys.

Beginning life no larger than a grain of sand, the queen conch will often attain a diameter of over 12 inches and weigh as much as five pounds. However, because the conch has the unfortunate bad luck of being tasty to other types of predatory mollusks, crabs and several species of fish, the chances of one growing to its full size are about one in one million.

For about three months after hatching, the conchs are propelled by ocean currents. Soon they develop small dark shells and wing-like lobes. After several months they settle to the ocean bottom.

Conchs usually dine on dead or decaying mollusks and crabs. They have a keen sense of smell and two well developed eyes that aid them in their search for carrion. The conch's sensitivity to changes in light acts as a defense mechanism. If you've ever picked up a conch

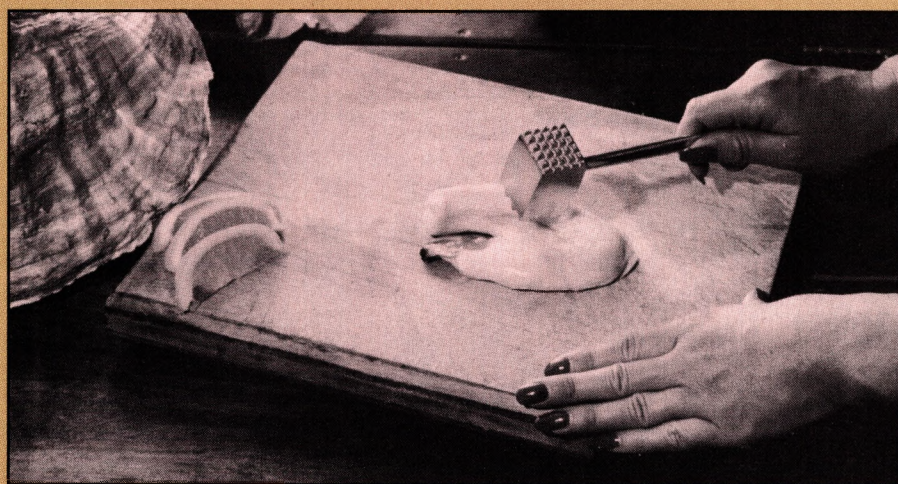
is quite amusing. Rather than crawl like other mollusks, it actually hops along the ocean floor, covering distances of more than a mile in a few months.

In shallow water it is possible to cover large areas of conch territory by pulling a snorkeler slowly behind a boat with a long rope. Once the conch is spotted, the snorkeler simply releases the rope and descends to the conch, picking it up and placing it in the goodie bag.

The laws governing the taking of queen conch in the Bahamas are few. However, it is wise to take only the largest conch and only what you will eat. Because of overfishing in the Keys, the Florida legislature has passed an ordinance (effective June 17, 1985) making it illegal to take queen conch in state waters. Since some Caribbean governments may have marine preserve regulations, it is always a good idea to check with local authorities before taking any saltwater products.

University of Miami scientists are studying new methods to increase the conch population. Conch farming is one option, with hatcheries in the Florida Keys, Bahamas and the Turks and Caicos Islands.

There are several ways of cleaning and preparing conch. One way is to simply smash the shell and pick out the meat.



you may have noticed it will immediately retract into its shell. The yellowish-brown shell serves as its home and main defense. It is spiral shaped and rough outside, while the inside is rose colored and has a porcelain-like finish. Occasionally, pink pearls can be found in the mantle and, while not very precious, they are very beautiful. Sometimes ornamental cameos are cut from the shell. It is often found whole in tourist shops.

Catching conch is really quite easy. A pair of heavy canvas gloves and a mesh goodie bag are the only tools required. The conch, like its cousin the snail, is a slow moving animal. It can usually be found in the shallow grassy beds or the sand areas of the reef. Watching it move

Another is the native method: Count to the third ring on the crown and tap the shell with a large knife or other blunt instrument to crack it. Insert a small knife and sweep the circumference of the shell, cutting the muscle. Then remove the animal.

If you would prefer to save the shell, try freezing the animal. Then, without thawing, boil it. Use a fork or other sharp instrument to pull the animal out.

Once the meat is out, it must be thoroughly scrubbed and rinsed. Large conch should be pounded with a meat tenderizing hammer to break up the muscle fiber. The conch can be fried, barbecued or baked using most any fish or shellfish recipe. 

CONCH CHOWDER

1½ lbs. fresh conch
3 lbs. white potatoes
¼ lb. bacon strips
2 medium sized onions
1 large green pepper
2 large fresh tomatoes
1 can tomato paste
2 quarts water
4 cloves garlic
10 bay leaves
2 T barbecue sauce
1 tsp. poultry seasoning
1 T oregano
½ tsp. black pepper
1½ tsp. salt
4 oz. bread crumbs
2 lemons, squeezed
dash red pepper (optional)

Pan fry the bacon and onions, add garlic, green peppers and cook until well done. Put tomatoes, tomato paste, potatoes, water and all other ingredients into a crock pot (pressure cooker). Then add bacon and onions. Cook for at least eight hours.

CONCH FRITTERS

3 C ground conch
1 C flour
1 tsp. baking powder
2 T diced onions
2 celery stalks, diced
¼ tsp. salt
½ tsp. pepper
1 egg
½ C chowder broth and/or 1 fresh tomato and 2 T water

Mix the ingredients well and roll into small dough-balls, deep fry in 375°F oil until golden brown. Serve sizzling with toothpicks.

CONCH SALAD

1 lb. conch
6 oz. tomatoes
2 oz. sweet pepper
2 oz. celery
3 oz. onions
3 oz. cucumbers
2 oz. lime juice

Dice all the ingredients together in a large mixing bowl, adding hot pepper and salt to suit your taste. Serve over a bowl of fresh lettuce leaves.

SEAFOOD SAUCE

8 oz. mayonnaise
8 T barbecue sauce
1 lime, squeezed
dash hot pepper (be careful)
½ clove garlic, ground
1 tsp. parsley
¼ tsp. salt

Mix all ingredients together well and serve in a small dish.

or try

4 oz. horseradish
6 oz. chili sauce
1 lemon
½ tsp. black pepper

Mix thoroughly to satisfaction.

WRECK FACTS

(Continued from Page 14)

fired two torpedoes into the tanker's port side. The explosion was heard for miles and private boats from Appalachicola, 21 miles away, sped to the rescue. The *Empire Mica* lost 33 of its 47 crewmen. She burned and drifted for 24 hours, finally sinking in 100 feet southeast of Cape San Blas. Dive Shops in Panama City and Youngstown, Florida, schedule trips to the wreck.

Captain M. Boulay, Canadian Forces Development School, Richelieu, Quebec, Canada, writes: "I am the vice-president of the military diving club, *Eau Mega*, and am interested in obtaining information on dive sites in Lake Champlain." The Champlain Maritime Society can supply some information. Contact the president of the society by writing: P.O. Box 745, Burlington, VT 05402. There is a dive magazine in Quebec that occasionally features Champlain wrecks: La Plongee, 1415 rue Jarry est, Montreal, Quebec, Canada H2E 2Z7. SKIN DIVER Magazine featured Lake Champlain wrecks near New York in the March 1983 issue.

Bob Cembrola, executive director of the Maritime Museum at Fall River, Massachusetts, writes: "We are holding our second annual Wreck Day in January at

the Marine Museum at Fall River. Last year's gathering was a huge success and we think this one will be bigger and better. Speakers include Jim Jenney, Marty Bayerle, Dean Cycon, Bill Campbell, Betty Seifert and Bill Quinn. Shipwreck research, exploration, salvage, law and artifact display will be discussed. There will also be a tour of WW II vessels in nearby Battleship Cove." For this time, date and other details, write or call Bob Cembrola or Dan Hazard, P.O. Box 1147, Fall River, MA 02722; (401) 278-8974.

Barry Cox, Dublin, Virginia, asks what happened to the world's heaviest wooden ship, HMS *Lord Clyde* built at Pembroke, England, in 1864. The *Lord Clyde* and her sister ship, *Lord Warden*, were the largest and fastest timber-hulled ships built in Britain. The *Lord Clyde*, designed by Sir Edward Reed, was sold in 1875 for the sum of 3,730 pounds, then broken up for scrap. She was constructed of five layers of wood and iron. She is listed in Oscar Parks' *British Battleships* book. This excellent resource consists of two volumes of records of every ship in the British Navy. Another source is Conway's *Warships, 1869-1905*. Jaynes *Fighting Ships*, another popular series, does not begin until 1898.

Jon Ayling, Dorset, England, sent me *Diver's Guide to the Weymouth and Portland Area*. I was most surprised at the number of wrecks in this part of England. More than 40 are listed including

several early steamships, a French submarine, an East Indiaman, an American liberty ship, a battleship, a coal carrier and merchant vessels from WW II. For information write to Jon Ayling, 10 Cowleaze Rd., Broadmayne, Dorchester, Dorset, DT2 8EW, England.

Divers who like the ABC islands will enjoy a *Diving and Snorkeling Guide to Bonaire, Curacao, and Aruba* by George S. Lewbel. In addition to seven shipwrecks, the 96 page paperback depicts car and truck bodies and cannons on the coral reefs of the Dutch West Indies. The book is available from Pisces Books, P.O. Box 678, Locust Valley, NY 11560. It is \$8.95 plus postage.

Safe diving to all. Be sure to include a stamped, self-addressed envelope when writing: Ellsworth Boyd, 1120 Bernoudy Rd., White Hall, MD 21161. >#



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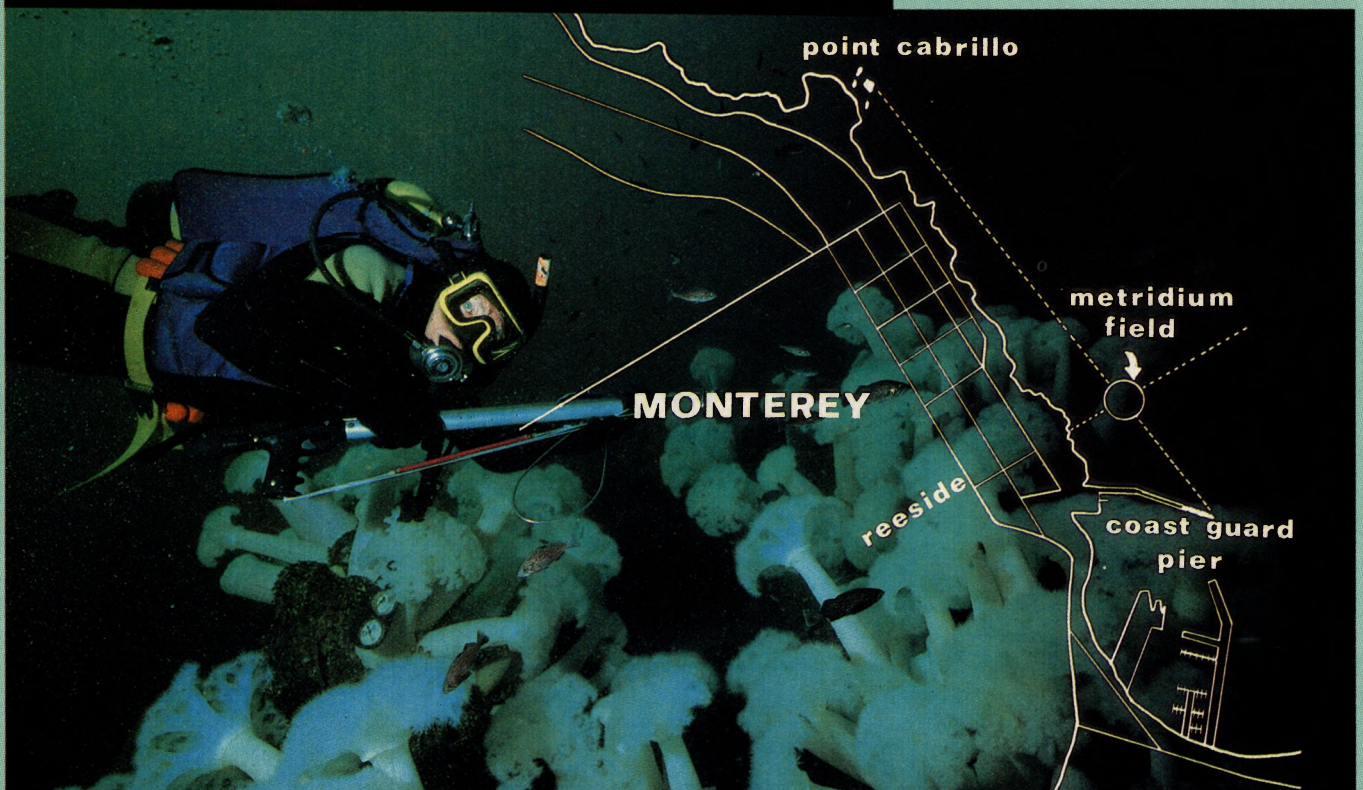
Metridium Field

The selection of dive sites in the Monterey area is virtually limitless. The ocean waters extending south from Del Monte Beach to Point Lobos State Reserve, just south of Carmel Canyon, offer an incredible diversity of diving experiences. It seems that almost anywhere you find a canopy of kelp you also find beauty and excitement underneath.

On one of those few occasions when our dive plan didn't include a kelp bed, my dive buddies and I launched an inflatable at the boat ramp inside the Monterey breakwater, intending to search for the remains of a small Cessna aircraft. We knew the wreck had settled on a sandy bottom somewhere off the Coast Guard pier in 40 to 60 feet of water.

Although the surface was flat and there were no large swells or wind chop inside the bay, the water was full of plankton and visibility was a dirty ten feet at best. We decided to leave our dive buddy, Bob Stein, on the boat, while Don McMahan and I executed a random pattern of

At Metridium Field, anemones form a surrealistic forest of white plumes with stalks rising up to two feet above the seafloor.



A Magical Wonderland Off Monterey, California

TEXT AND PHOTOGRAPHY BY STEVEN G. ROSENBERG

bounce dives. We thought pieces of the wreck might show up pretty well against the sandy bottom even if they were completely overgrown. In any event, we knew our chances of locating the plane were slim, but it gave us the opportunity to explore an area that was new to us.

On the way around the end of the breakwater we passed close to barking sea lions, sunning themselves on the rocks near the water's edge. Several of the younger animals splashed into the water and danced around the boat, as if inviting us to join in their play.

On our first dive we dropped onto the predictably flat sandy bottom and arbitrarily picked a direction. We swam just off the bottom to avoid kicking up clouds of silt. A little light filtered down from above, but the murkiness of the water required the use of our dive lights. The bottom was dotted with *Stylatula elongata*, white seapens, and *Pachycerianthus fimbriatus*, tube anemones. I wasn't surprised that these types of filter feeders would thrive in the area, given the large amount of plankton in the water.

After being down only a few minutes, the first of 100 or more rocky outcroppings rose sharply in front of us. What seemed like a forest of large, white-plumed *Metridium* anemones literally covered the exposed rocky surfaces. Ranging in color from snowy white to varying shades of brown and orange, they extended from 16 inches to two feet in height. When expanded, this spectacular species of anemones is easy to identify by its long graceful stalks and the very large number of tentacles. The latter give the animal a soft, frilly or fuzzy appearance at the top.

Don and I cruised through a field of *Metridium* in utter amazement. We had seen a few scattered clusters of these beautiful animals in other parts of Monterey, but nothing like this. Nestled in among them were rockfish, lingcod, cabezon, crabs and a large assortment of other marine denizens. In the darkness and poor visibility, the field of anemones seemed to extend forever. Our air nearly gone, we were forced to return to the surface, where we emerged bubbling with excitement over our find. Before we thought of jumping back into the boat we carefully took a visual fix on our position so we could return when the visibility improved. We noted that the *Metridium* field was at the intersection of one line drawn from the tip of the Coast Guard pier to

Point Cabrillo and a second line drawn as an extension of Reeside Avenue into Monterey Bay.

It was almost two months later, during the end of Monterey's Indian summer, when I returned to the *Metridium* field. It was one of those perfect days for diving in the bay, when the water was clear and calm, and the weather, sunny and warm. Jim Stratton, my wife, Kathleen, and I launched Jim's inflatable from the breakwater. This time as we rounded it we could see the bottom, 30 feet below. As



An octopus climbs through *Metridiums* searching for food. The dense concentration of anemones at this location offers a habitat for many marine animals that aren't normally found away from kelp.

we headed out to our anchorage, several sea lions provided an escort.

We anchored at the coordinates I had memorized. The water was a beautiful blue-green at the surface and the sun's rays formed flickering lines as they penetrated the depths. The anchor line helped us determine that the bottom was almost exactly 60 feet below the surface.

As we donned our gear we watched several large bull sea lions playing with helpless ocean sunfish, *Mola mola*, grabbing them by their dorsal or anal fins and flipping them back and forth on the surface. *Mola mola* are found inshore along the California coast in large numbers in late summer and fall. They apparently leave the deeper water to be cleaned of external parasites by such fish as the se-

norita wrasse and the sharpnose surperch. In the shallow water they fall easy prey to the playful and merciless sea lions, who usually immobilize them by tearing off their dorsal and anal fins. This leaves the sunfish without means of propulsion and they drop to the bottom.

After watching this practice over a number of years, it seems likely the sea lions attack the *Mola molas* more for sport than for food. Some people believe the sea lions immobilize the sunfish—leaving them alive in cold storage on the bottom—as a future food source. However, we observed that bottom scavengers such as bat stars and rock crabs immediately attacked the helpless victims. Therefore, it is doubtful that the sea lions would have a meal to come back to.

After slipping into the water I hesitated long enough to watch a seal lion grab a three foot *Mola mola* not ten feet in front of me and head in the other direction. I dropped down, following the anchor line. Only 20 feet from the surface I could see Jim already at the bottom. He seemed to be surrounded by a field of white cotton balls that reached upward all around him.

The bottom was alive. Even as a group of four *Mola molas* swam slowly by, just over our heads, I could see a good sized octopus crossing a sandy area and a two foot monkeyface eel swimming in the open. The water temperature, which had been a comfortable 58°F at the surface, dropped nearly ten degrees, probably because of an upwelling of plankton-rich cold water. The plankton at the bottom caused a slight cloudiness, but the visibility held between 20 to 30 feet, allowing for a spectacular vista.

Looking up, we could see a shimmering sunburst surrounded by differing shades of green. *Metridium* rose up all around us in billowing mounds. A foot away, one octopus was sliding across the sand next to a series of seapens, while another cruised through a cluster of white-plumed anemones and rockfish.

All of this could be seen and experienced, and yet there was not a single stalk of kelp within 100 yards. We surfaced next to our boat. As we were in the process of stowing our gear, boat loads of divers came by heading for Lover's Point, Chase Reef and Hopkins Reef. Some of them stopped and asked why we were diving in the middle of the channel. I especially remember one diver remarked, "There can't be anything to dive on out here, there isn't any kelp!"

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Nikon Inc. is offering a free set of extension tubes, the perfect accessories for use in underwater macro photography, with the purchase of a Nikonos V camera body. In addition, the purchaser will receive a \$100 travel certificate offering significant savings at any of six locations—Andros Undersea Adventures, Andros, Bahamas; Captain Don's Habitat, Bonaire; Spanish Cove, Grand Cayman; Port Largo Resort, Key Largo; Anthony's Key Resort, Raotan, Honduras; and Flamingo Beach Hotel, Bonaire.

With the purchase of a Nikonos SB-102 or SB-103 Speedlight, the purchaser will receive a \$100 travel certificate for the same resorts.

To receive the free extension tubes and travel certificates, the consumer simply completes the Getaway Giveaway application obtained from the dealer, along with the product's warranty and bill of sale, and mails it back to Nikon Inc. The consumer will receive the extension tubes and/or the travel certificate within four weeks.

This promotion applies only to Nikonos equipment obtained by the dealer through Nikon Inc., the U.S. distribution subsidiary of Nippon Kogaku KK, Japan, manufacturer of Nikon cameras and photographic accessories.

DAN ACCIDENT SEMINAR

The U.S. Coast Guard Air Sea Rescue Station and Dive Strike Team at Elizabeth City, North Carolina and the Divers Alert Network will hold a dive accident management seminar November 9-10. Faculty from the Coast Guard and DAN headquarters will cover signs, symptoms, physiology and early treatment of diving emergencies. Other topics will include medical problems and diving, hypothermia, near drowning, the Coast Guard's Dive Strike Team and rescue coordination service. Dr. Norris Eastman of the University of Virginia will speak on rescue techniques and search and recovery.

The purpose of this class is to prepare the diver or health care workers in early management of diving emergencies. The two day seminar is open to all divers and health care personnel for a \$50 fee. Call (919) 684-2948 or write DAN, P.O. Box 3823, Duke Medical Center, Durham, NC 27710.

NAUI COLLEGE MOVES

To meet the need for expanded facilities owing to the school's rapid growth, NAUI College has moved its offices and classrooms to 27402 Camino Capistrano, Suite 103, Laguna Niguel, CA 92677; (714) 582-0186. Office hours are Monday through Friday 9:00 am-5:00 pm. All alumni and prospective students are welcome to visit.

MIKE WOODWARD

Mike Woodward, son of Dave and Gay Woodward, and well known in the diving community for teaching scuba and underwater photography courses at resorts in the Bahamas, Cayman Islands and Virgin Islands, was killed August 19, 1985 in a plane crash off St. Thomas in the USVI. He was 30. Donations are being accepted in his name by the Cousteau Society, 930 West 21st St., Norfolk, Virginia 23517. ❧

ATOCHA SITE RESEARCH

The spectacular archaeological discovery of the main part of the *Atocha* wreck site has sparked new research opportunities for shipwreck archaeology in the Americas. Under the direction of R. Duncan Mathewson III, a comprehensive interdisciplinary research design is being implemented with a number of researchers from the academic community. Scholars interested in conducting research on the site and/or its artifact assemblage should send a 250 word proposal and resume for consideration. All research inquiries should be sent to: R. Duncan Mathewson III, Chief Archaeologist, Treasure Salvors, Inc., P.O. Box 1360, Key West, FL 33041.

Over the next several years a special opportunity is being offered to recreational wreck divers with archaeological experience interested in helping map the *Atocha* site. Priority will be given to members of The Atlantic Alliance for Maritime Heritage Conservation, Inc. For more information about this and other shipwreck projects being sponsored by The Atlantic Alliance, call Joyce Hayward at (419) 483-3074 or write to Shipwreck Projects, The Atlantic Alliance, P.O. Box 27272, Central Station, Washington, D.C. 20038. ❧

DACOR LIGHT RECALL

Dacor Corporation has ascertained that an internal gas build-up during the charging cycle is possible in the UL950 light. If this occurs, a spark can ignite the gas, causing the plastic lens to be forcibly thrown from the light. The bulb may also shatter, producing a potentially hazardous situation. At no cost to owners, Dacor dealers will retrofit UL950 lights and eliminate this possible problem. If for any reason you cannot return your UL950 light to a Dacor Dealer, send it directly to Dacor Corporation, 161 Northfield Road, Northfield, IL 60093, for retrofit, again, at no cost to you. Do not use or recharge your UL950 dive light until the retrofit has been completed.

The above retrofit is for model UL950 underwater lights that have a gray or orange foam pad inside the body and between the bottom of the battery and the recharging port. Units with a white foam pad do not need retrofit. ❧



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Technifacts

BY E.R. CROSS



The basic purpose of this column is to stimulate an interest in the technical aspects of both sport and commercial diving and dive safety. It is devoted to questions from SKIN DIVER readers. The answers are designed to apply to the majority of situations, problems and equipment encountered today.

Part of this month's Technifacts will provide follow-up information on an unusual commercial job that contributed to the successful completion of a harbor construction job in Hawaii (see Technifacts, August 1983).

HAWAIIAN HARBOR FOLLOW-UP

In August 1982, construction was started on a second major harbor for the island of Oahu. This \$65 million project is on the leeward side of the island, about 20 miles west of Honolulu. One of the principal pieces of equipment, purchased specially to make this a successful project, was a giant, German built, backhoe-type excavation machine—a DEMAG H-241. At 350 tons this is one of the largest such machines ever built.

In March 1983, the DEMAG was working close to the shore while digging at a depth of 40 feet in the new harbor. Suddenly the bank gave out under the machine and it ended up completely submerged. Divers rigged a surface operated hydraulic system to the power units of the sunken DEMAG and, after righting the machine, "walked" it up a ramp to dry land. After a four month overhaul, the unit went back to work.

One of the unusual facets of the harbor dredging was that a strip of land was left between it and the ocean. This prevented the silt laden water in the area being excavated from running into the pristine waters along the west side of Oahu. The heavy silting that would have occurred could have been very damaging to the environment and extremely detrimental to the habitats that exist in some of Oahu's best diving and fishing areas.

Nine million cubic yards of coral have now been excavated from what was once a coral plain and Peter Kiewit Sons Co.,

of Vancouver, Washington, has created a 38 foot deep harbor capable of accommodating three oceangoing vessels and at least one barge. The entrance channel is 42 feet deep and 450 feet wide.

In August 1985, I visited the new



The DEMAG excavates the plug separating the new Hawaiian harbor from the Pacific.

Campbell Industrial Harbor and watched while the salvaged DEMAG excavated the "plug" that separated the new facility from the Pacific Ocean.

Onshore facilities will include a 60 acre storage yard, roads, a 58 foot wide by 1,000 foot long pier and container handling systems. These should be started by August 1986 and completed in late 1987. In addition to major shipping, this new harbor will benefit boaters and divers who find their adventures in the protected waters of Oahu's lee shore.

GAS HAZARDS

In some commercial diving jobs, potentially dangerous explosive vapors can develop. In most cases the vapor will be hydrogen. However, there can also be a radical increase in the oxygen partial pressure that may increase the potential for an explosive reaction or fire.

The sources for a hydrogen buildup include: oxy-hydrogen cutting torches; electrolysis; some types of welding electrodes; magnetic particle inspection work; and cathodic protection systems.

The oxy-hydrogen cutting torch produces, or actually leaves, unused hydrogen in the water. This unburned hydrogen can collect under gas-tight places, such as deck overhangs, in corners of compartments and in a habitat.

An electrolysis process generates some hydrogen that, again, must collect in pockets of some kind to become hazardous. Some types of inert gas welding electrodes, particularly if the welding wire is dirty, can generate hydrogen. Cathodic protection systems can generate quite large volumes of hydrogen, particularly in those requiring high voltages (more than 12 volts). The hydrogen results when disassociation of hydrogen and oxygen molecules takes place. These now separate gases (that once combined chemically to make water) can collect in pockets under or within a structure and create a potential explosion problem.

Under certain conditions marsh gas, methane or hydrogen can emanate from decomposing material. These gases are more likely to be encountered when working around sunken vessels that have a cargo of material that can decompose. These gases, if collected in an overhanging part of a compartment, can become potentially explosive and dangerous.

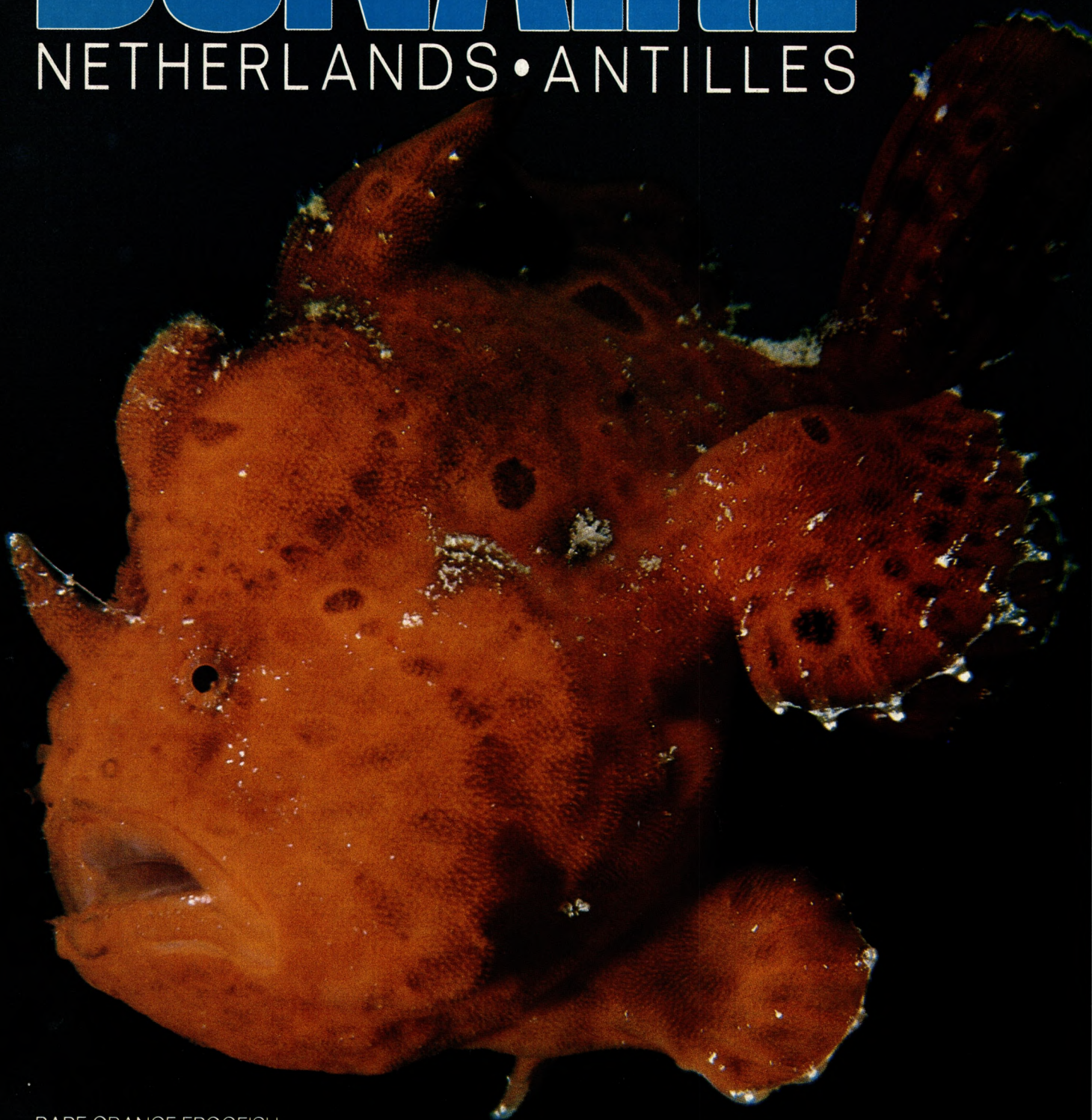
There must, of course, be a source of sparking or ignition for these gases to generate explosive forces. This can occur from the electric welding torch or, when working with cathodically protected structures, when one part of the structure is separated from the balance of the cathodically protected structure. Separating two parts of a cathodically protected pipeline, or adding a new part to a cathodically protected line, can generate a spark that could, if gases are present, generate an explosive force.

Another potential threat to diver safety when diving wrecks is that these gases will displace the air from the vessel's compartment or hold or form a bubble of gas under an overhang. Do not ever remove your mask or regulator to breathe from a bubble of "air" in a shipwreck. This may not be air but a potentially lethal gas that can cause death in just one breath. Even an open hatch in a partially sunken vessel can be hazardous since some of the gases that are generated by decomposing material are very heavy and displace air from the compartment. Deaths have occurred when workers low-

(Continued on Page 108)

BONAIRE

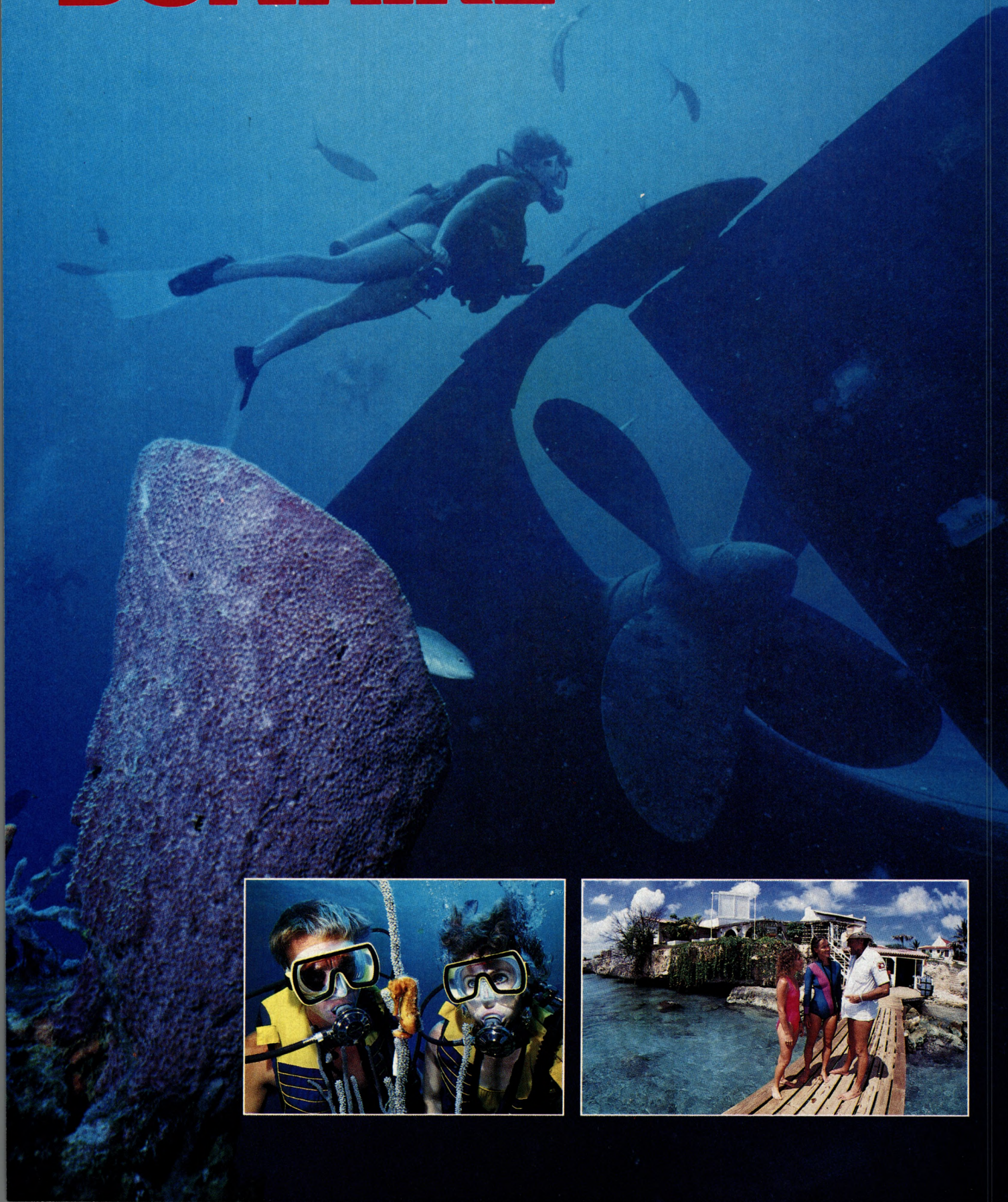
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RARE ORANGE FROGFISH
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BONAIRE

An Undisturbed
Paradise
In The Caribbean



**TEXT AND PHOTOGRAPHY
BY STEVE LUCAS**

Every morning the chibi chibis dive bomb you at breakfast. Just out of reach, they sing like canaries, preparing for the next attack. If there were banana trees, they would surely perch there. The yellow, as in "high up in banana tree," breasted finch gathers his nerve, then flies like a missile, stopping without a flutter on the edge of the table. Grabbing any stray grain of sugar, the little thief flashes skyward, warbles his song, then repeats his ritual.

So it goes every morning on Bonaire, little changes. The chibi chibi sings. The wind blows from the east. The water stays almost perpetually calm. The people smile and greet you with a "bon dia." The dive boats leave at 9:00 am and divers keep returning to its shores.

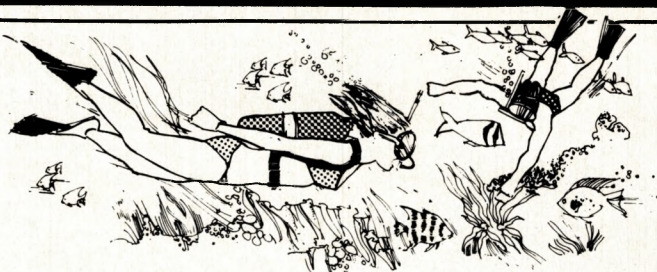
Hardly 50 miles north of Venezuela, from the air Bonaire looks like an enormous boomerang floating on a shimmering sheet of roughened indigo glass. To the south, wild donkeys graze around Arizona-like desert cacti growing out of a rough coral rock foundation. No one seems to know where they find water. To the north and west, the peak of the aquatic mountain rises well out of the ocean. Eight hundred feet above the sea Bonairian parrots, yellow cheeked parakeets and pink flamingos fly about a scene that seems to have been drawn from the pages of *Robinson Crusoe*.

Just offshore—literally anywhere just offshore—gardens of corals grow so close to the surface you really don't need scuba to see their beauty. Barely 50 feet out, the sea drops away with a quickness that snatches your breath. One hundred feet down it terraces, forming an underwater beach where garden eels sway, charmed by the song of an unheard flute. Then, again it plunges. Almost 700 feet it falls before rising again to form Klein (little) Bonaire, a tiny flat topped island mountain set in the crook of its larger sister one-half mile away. They don't like to call it wall diving; instead, it's a drop-off. The difference is purely one of semantics.

The sites bear names that are either descriptive or reminiscent of their discovery: **Forest, Rappel, Front Porch, Thousand Steps, Salt Pier, Cliff.** Some pay tribute to persons who are held in high esteem or have a special attraction to the location: **Jerry's Jam** for Jerry Greenberg, one of the fathers of underwater photography; **Carl's Hill** for Carl Roessler, a popular photographer, lecturer and world traveler; and **Ebo's Reef**, for Ebo Domacasse, one of the island's first, most respected and most knowledgeable dive guides. The names of others make sense only to the select: **Invisibles, Knife and Twixt.** They may not be the best sites in the

Caribbean basin, but better ones would be difficult to imagine. The best may exist only in our minds.

One hundred feet from shore the water is already 70 feet deep and the sponges are thick. Purple tubes, some four and five feet tall, extend toward the surface looking like royal cornets. Around them grow pale green soft corals that feel like leather. Black coral trees and tall gorgonians that appear to be feathery whips wave in the gentle current. Around them stand fluorescent orange elephant ear sponges. Six, seven and eight feet high, they appear to have been molded from plastic. Below,



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SKIN DIVER NOVEMBER 1985 37

BONAIRE

the drop-off continually terraces away, finally vanishing into the ink. Fish life is not thick, with the exception of the yellowtail snappers that frequently cloud your view and obscure your camera lens, but there is more than enough. Most fish are tame, having been handled by thousands of aquatic visitors. Moray eels come out of hiding, sometimes swimming freely in the open. Tiger and marbled groupers swim up to your faceplate as if inquiring what morsel you may have to offer.

Along the craggy ironshore ridges that form the bulk of the main island, the scene is similar. All diving is done on the western edge because the prevailing wind creates such forceful waves and surges on the east. On the calm side, shallow sand patches are quickly met by thick coralline growth. Walk in anywhere the craggy shoreline will permit; the swim to the reef line is only seconds away. Undoubtedly the easiest beach diving in this part of the world, the locals call it hassle free. It is.

Land exploration on the island is also a must. The only way to do it is via a rented car, van or motorbike.

A few miles south of the airport, following the ocean drive, a white mountain jumps into view: salt, tons and tons of freshly dried sea salt. Other than tourism, this is one of the two chief industries on the island. Opposite the sea, large pans hold shallow ponds of evaporating sea water. Some are pinkish in color owing to the organisms that live in the highly saline solution. Look closely, more than 10,000 flamingos nest near these flats and gain their pink hues from the same animals that color the water. The flats were once worked by slave labor and the remains of their tiny huts still line the beach.

Just south of the airport, take the first

road that turns inland. Cactus grows everywhere on a terrain that appears to be unable to support anything other than the lizards that run across the road, but it does. Drive slowly, the maximum legal speed is 60 kilometers (about 35 miles) per hour. Goat herds run across in front of you and wild donkeys stare at you from behind the prickly cacti.

North of Kralendijk, the main town, follow the road past the oil depot, Bonaire's other major industry, up into the hills. With a little searching you can find numerous caves and caverns with stalactites and stalagmites clinging to their ceilings and floors.

At the far end of the road you'll find the 13,000 plus acre Washington/Slagbaai National Park. Two routes take you on either a 15 or 22 mile odyssey through the hills. If you plan to get off the main road you'd best arrange for a Jeep-type vehicle. Budget rents just what you need. In the park, the rare Bonairian parrot screeches at you every sunup and sundown. All day long, small green parakeets with bright yellow heads fuss at each other with high, shrill screams. Down by Lake Goto Meer, the flamingos wade on stilt-like legs through the salt pond, straining the water with their odd bills. At any slight encroachment they run across the water to gain enough air speed for their gangly takeoff, finally lifting into the air on pink wings with black fringes. If you want a close-up photo, take a long telephone lens. Using anything less than 1000mm is probably a waste of film.

In Kralendijk, be prepared for a bit of educational culture shock. Bonaire, although having an independent government, is loyal to the Dutch and is part of the Netherlands Antilles. The population is very well educated and you are likely to hear locals speaking three or four different languages. In addition to their native Papiamentu, a mixture of Dutch, Spanish and Portuguese, almost everyone speaks fluent Dutch, Spanish and English. Some converse well in French

and German.

Walking through town, you can purchase almost anything available in the States, although prices will often reflect the import duties imposed by this island nation. Restaurants with cuisines ranging from seafood to Chinese to steaks can be found in a fairly compact business district. The Zeezicht faces the town pier and serves some of the finest fresh conch on the island. The Bistro des Amis treats you to French onion soup, escargot and fine wines. The Beefeater serves truly sumptuous continental steaks and seafood. At the China Garden or Great China select from menus of Oriental delights or try the Mona Lisa or Rendez-Vous. For local lunches slip over to the Supercorner and for good old fried chicken, a hamburger or an ice cream dessert, try the local version of Burger King, Tropical Burgers. If you're only in town to shop and are looking for something special, take a look at Littman's Jewelers. With a new line of diver oriented, custom-made trinkets, they have a special offer for repeat mail order customers.

Finding a place to stay on the island is simple. It really doesn't matter what your travel budget permits. You can find anything from simple economy rooms to deluxe hotels, apartments and villas. At the north end of the island's hotel strip is one of its best known accommodations. It's not a hotel, it's not really a resort, even though the sign outside calls it one. What it is, is CAP'N DON'S HABITAT. "A place for serious divers," the Cap'n says. An American expatriate of 23 years, Captain Don Stewart hates it when someone refers to his place as a hotel. "It's a dive shop with rooms," he insists and since he designed it, he should know.

Cap'n Don is sandpaper-coarse on the outside but his heart is platinum plated. It takes a day or two to get through, but when you do you'll find an old seaman who is really in love with the ocean that laps at his door. A good place to take the challenge to get to

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BONAIRE

know him is at the captain's restaurant-bar, the Quarter Deck. It sits on an iron-shore cliff overlooking Klein Bonaire.

"We do not have guests," his business manager Morey Ruza insists. "We have friends." An ardent cave diver who has charted dozens of inland dive sites on the island, he and the captain have a good relationship. With a pile of computer printouts to illustrate his point, he loves to discuss their projects. In ad-

dition to the several dozen cottages that are available to their "friends" for a reasonable fee or "ration of grog," Habitat is now building 27 individual villas next door to be sold to more permanent "friends." Sizes range from one to three bedrooms and as an option may be rented out, an aspect that will be managed by Habitat.

Habitat is a non-conformist place to stay. A 1984 Sports Illustrated article referred to the captain, his crew and "dive shop with rooms" as being a bit strange in an article entitled "Eyeball to Eyeball with the Weirdies." Although that may be a bit strong, the captain definitely strives to please those people who do not find any form of regimentation to their liking. You dive when you please, 24 hours a day! You don't even have to make special arrangements; just walk down to the dive shop dock when the urge hits you and jump in. Tanks are available anytime. Of course, if you want to be a bit more conventional, the dive boat does leave promptly at 9:00 am and 2:00 pm.

Habitat is the only PADI Five Star Instructor Development Center in the southern Caribbean and a great deal of emphasis is placed on instruction. With a complete underwater photo center including camera rental, film processing, underwater video and courses taught by resident pro Andre Nahr, it is a great place for anyone who needs space.

Habitat is also the base of operation for Dee Scarr's TOUCH THE SEA. Well known in the Caribbean for her ability to relate to the sea's creatures, Dee takes small groups of divers on individual tours of many reefs including those found directly in front of the dive shop. Under her supervision you learn to pet a moray, get nose to nose with a stonefish and snuggle with a grouper.

A short hike to the south is one of the island's two major resort properties, BONAIRE BEACH HOTEL and its adjacent BONAIRE SCUBA CENTER. If you're coming to this island looking for a wide strand of beach you'd better stay here. With the exception of the soft sand found at this spot, beaches are a rarity. The hotel is currently undergoing a complete renovation with portions already completed. In addition to the large thatched roof beach hut bar and dining room recently finished, the property is being completely relandscaped.

With two restaurants and its own Black Coral Casino the evening entertainment is casual and pleasant. Buffets are set several times each week and a festive evening of live entertainment is scheduled on at least one night during your stay.

The hotel is spread over a great deal of property giving more than adequate space to find a private place. For non-diving activities, the resort is perfect for families and small children. A miniature golf course is set between the beach

BONAIRE SCUBA CENTER

BONAIRE BEACH HOTEL



Bonaire Beach Hotel - 145 spacious, air-conditioned rooms situated on 12 sprawling acres; 600 ft. of white sandy beach; 2 regulation tennis courts; volleyball; Sunfish; Windsurfers; mini golf; bicycles; 2 restaurants; 3 cocktail bars; nightly Happy Hour; Black Coral Casino; disco; live entertainment; specialty nights.

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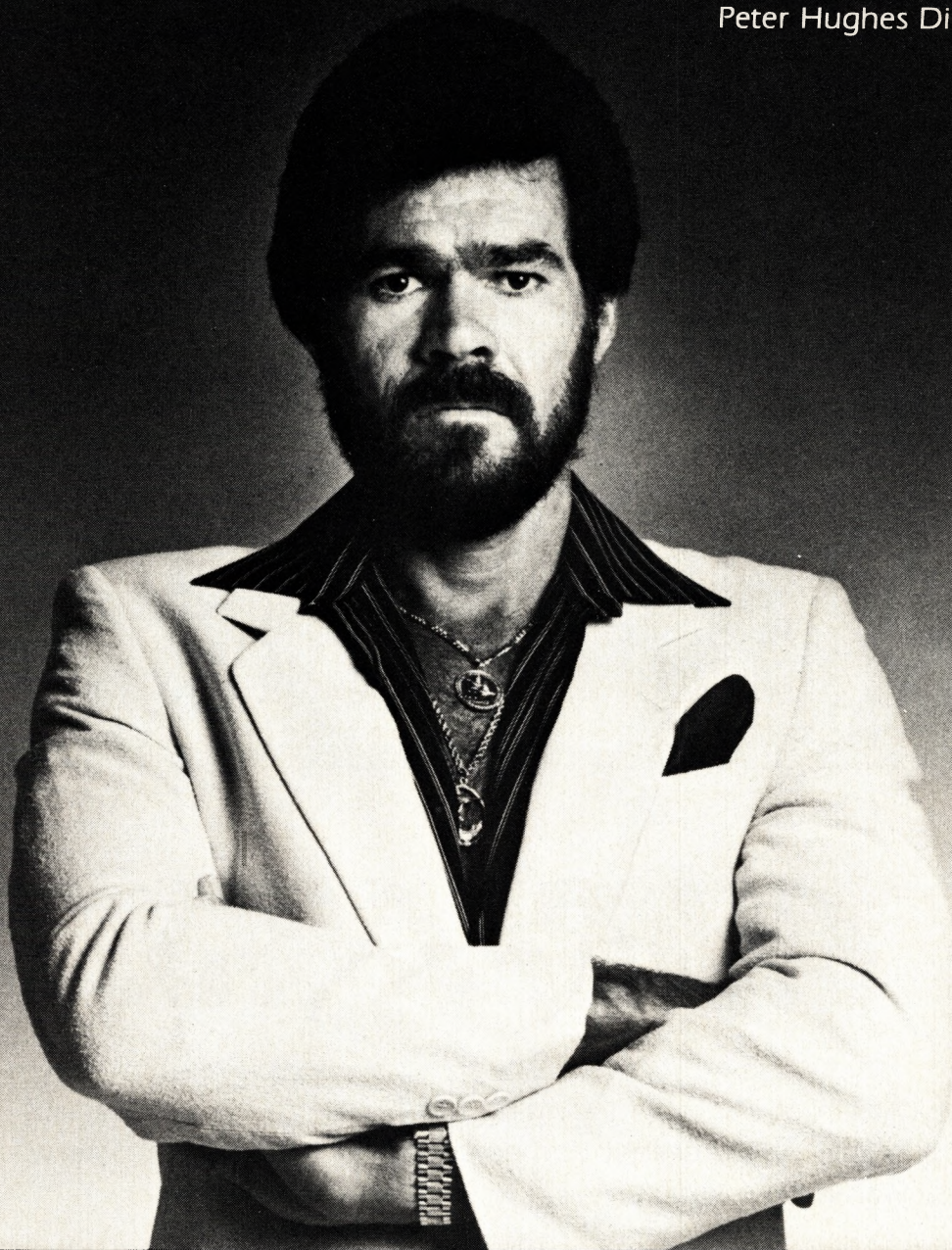
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BONAIRE

hut and main hotel property. Just south of the beach hut, behind the dive facility, are several lighted tennis courts. Sailboarding and sunfish sailboat rental are available any day of the week. In the early evening, you can board the sailboat *Lady Joma* and watch the sun turn the ocean crimson as it slips beneath the waves.

Owned by Al Catalfumo and Bonairian Eddie Statia, the Bonaire Scuba Center offers a full service operation with flattop boats leaving the dock each morning and evening. Eddie primarily serves as the operations manager and Al is based in New Jersey serving as its director of marketing.

Personalized diving is their creed, with dive guides who frequently go in the water with you to point out the special places and animals that have made Bonaire so popular.

Underwater photography plays a major role at the center. It really doesn't matter if you are experienced in this specialized aspect of diving; you can rent almost any piece of gear from simple Hanimex cameras up to sophisticated

ed Nikonos 15mm lenses. Underwater cameraman Gill Nafts provides photo instruction, repairs cameras and processes E-6 type film daily in a modern photo lab. Photo coaching and photo equipment charging are also available.

When not diving on Klein Bonaire via boat, beach diving access is easy. **Front Porch Reef** drops to a depth of more than 90 feet just in front of the dock. At 70 feet an old pilot boat lies on its side making a very nice photo prop. North of the pier, the growth is dense; to the south, it's a bit sparser.

One shop specialty is truck diving. That doesn't mean swimming down to a sunken truck either. Since most reefs are very close to shore it is often faster to get to them via land instead of water. Along the way, scenic routes are taken with stops at places like Thousand Steps. Many divers, although considering the trip a bit strange before joining the excursion, return frequently for a repeat experience. At the end of most trips, the crew almost always stops at the village of Rincon for a cold brew.

Opposite the Yacht Club, just south of Bonaire Beach Hotel, is a group of very pleasant villas, CARABELA BUNGALOWS. With its own dive operation, BUDDY'S DIVE RESORT, it caters to divers who want to be as unrestricted as possible and prepare their own

meals. Fully air-conditioned one and two bedroom apartments are each equipped with a kitchen to make it easy to enjoy the pleasures of the island with more home comforts. Several food markets are only minutes away by car.

While not directly on the water, Carabela is just across the street from Playa Lechi beach. Buddy's Watersports provides boats and necessary equipment with easy pickup at the Yacht Club.

Just south of the Town Pier, the POSEIDON NEMROD CLUB BONAIRE has a small dive facility. Dive packages, equipment rentals, air, surfing, sailing, waterskiing and water taxi service to Klein Bonaire are all offered.

Operated by Anton van den Heetkamp, the club is affiliated with a European dive organization. Resort courses and certification are also offered.

A few minutes south of Kralendijk, the FLAMINGO BEACH HOTEL and its DIVE BONAIRE have earned the reputation of being one of the most efficient facilities in the Caribbean, capable of handling up to several hundred divers at a time. A well planned, compact resort hotel, it has two restaurants, a casino where barefoot gambling is encouraged, a large Jacuzzi-type whirlpool, pool, boutique, conference room, waterside bar, underwater photo center and several

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PHOTO ANDY MARTINES
LAB AND SCRIPT BY ME



Here at 40 feet just looking things over, and pleased to discover the reef thriving & healthy. Surprised, considering the hundreds of visitors who pass this way you know! I really like it here, watching my guests frolicking with the fish, exploring our small wreck & in general enjoying a super dive in a 100% protected environment. This picture was shot just in front of our HAMLET, a unique furnished apartment project, a new addition to HABITAT.

The last several years have been financially superb, allowing us here at Habitat to make things bigger and better for you divers. More boats, new beds, aluminum tanks, and a continual upgrading of the property.

After 30 consecutive nonstop years of catering to all sorts of divers, I still consider HABITAT living proof of my concept of diving freedom. You, my guests, have been a super clientele who have made this concept work and my life a pleasure. My profound thanks to you who have shared diving with me over these many years.

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BONAIRE'S BACHELOR'S BEACH APTS. THE DIVER'S CHOICE



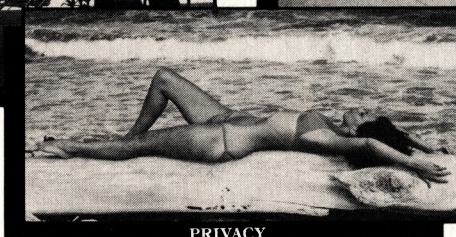
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BONAIRE

piers making water access easy.

Two story buildings with a Spanish flair are lushly landscaped with many small walkways to move you through the maze of green plants and red flowers. Although it is only a short walk from anywhere to anywhere else, the carefully thought out facility gives you the feeling you have more than adequate personal space.

Both the Chibi Chibi and Calabas restaurants, as well as the bar, are next to the sea. Menus are varied and will satisfy most any culinary connoisseur.

Dive Bonaire, the flagship operation of Divi Hotels' Peter Hughes dive resorts, is at the southern end of the complex. Managed by Mike Clarkson, it has a large fleet of fast boats, with daily preselected dive destinations, that pulls to the dock to load. You sign up a day earlier for your choice of sites. The entire procedure is quick, leaving you with the impression there are considerably fewer divers at the hotel than actually are present.

Diving is not limited to the boats. **Calabas Reef** is just out front and can be dived almost anytime, day or night. Tanks are placed on the end of the dock, if requested, until 10:00 pm.

Plans are presently underway to build a second dive facility at the north end of the hotel complex. To be managed by Mike Conkel, the new facility will not replace, but will enhance, the operating ability of Dive Bonaire. A well designed complete service shop will be built as a part of a new concrete pier. You will be able to walk out the pier, through the open air shop, pick up your gear and board your boat.

New and larger facilities are also being built for Photo Bonaire, Dive Bonaire's underwater photography center. Currently in an almost remote southeastern corner of the hotel, the new expanded shop will be moved to the location of the present meeting rooms. Managed by underwater pros Jerry Schnabel and Suzi Swygert, Photo Bonaire offers one and two day complete photo courses; PADI and NAUI underwater photo certification; emergency camera repairs; photo recharge facilities; film processing; and a loaner program for Ikelite and Helix photo equipment. One very popular option is the personalized underwater video shoot, where your favorite dive site—with you and a friend as stars—can be recorded on tape to relive whenever you choose.

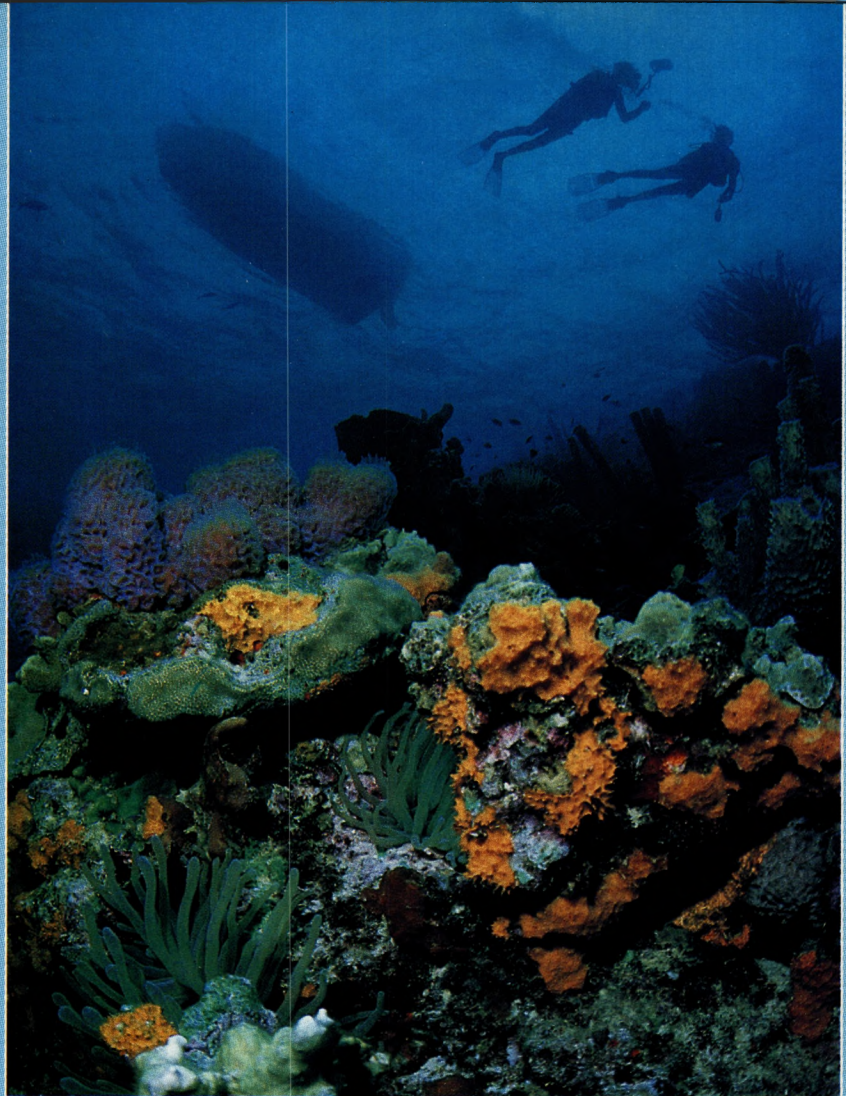
The Flamingo is also in the process of a major expansion program. Under the supervision of Lita Gold, Club Flamingo



Many Bonaire dive sites have descriptive names like Thousand Steps (above). Accommodations vary from economy rooms to deluxe hotels and dive services range from personalized to those that efficiently handle hundreds of divers at a time.



Dive boat at Carib Inn



The colorful sponges at Sponges



Bonaire Scuba Center and pier



Carib inn pool



ALM DC-9



Divers with tube sponges at Ebo's Reef



Elkhorn coral at Forest

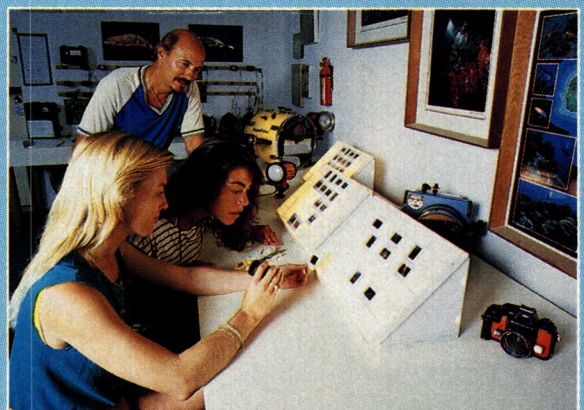


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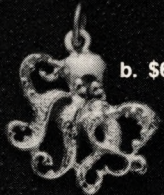


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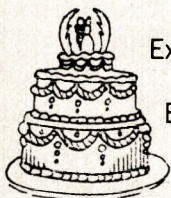
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BONAIRE

in Bonaire, a time share facility, is being constructed just north of the existing property. Forty new time share rooms, with a new meeting room facility that will accommodate more than 100, are expected to be ready by December. Divi Hotels will make the properties interchangeable with similar properties in Barbados, Aruba and Cayman Brac.

Just south of the Flamingo is Bruce Bowker's CARIB INN. A small resort built around a courtyard pool, it is designed to accommodate individuals and groups of less than 20. Each room has its own refrigerator, and some are complete apartments with living room/kitchen and separate bedroom.

Bruce has been on Bonaire almost 13 years and is one of the most knowledgeable dive guides on the island. Many of the popular sites, such as Rappel, were first dived by this quiet, unpretentious businessman. Today, he still guards the location of his best dives, taking only his personal guests to experience the lushest sites on the island.

With a complete dive operation on the premises, dives are made from one of two very fast dive boats. Groups are always small and it is unlikely you will be diving with more than a half dozen persons at a time.

Carib Inn does not have a restaurant; instead guests may prepare their own meals or walk to any of the restaurants in Kralendijk, just ten minutes away.

Five miles across the island, taking the eastbound road just south of the airport, is one of Bonaire's more unusual resorts. With high privacy fences surrounding the property, the SOROBON BEACH RESORT is designed for naturists. The private beach and grounds are designated swimsuit optional.

The resort faces the prevailing wind, making air-conditioning unnecessary. Meals may be prepared in your room or taken at the small open air restaurant.

In front of Sorobon is Lac Bay. It is very shallow and you can walk almost a half mile in less than waist deep water before reaching the high rollers.

Special naturist dive trips are available or diving with Bonaire's larger operations can be arranged by Sorobon.

South of the airport, in an area called bungalow row, BACHELOR'S BEACH APARTMENTS is a Spanish styled villa with large sundecks, cactus garden and 30 foot pier. An alternative to the faster pace of some resorts, you stay in your own apartment while swimming, diving and dining at your leisure.

With fully furnished one or two bedroom apartments, the units can comfort-

ably accommodate four to six. Each has a living room, bath and kitchen.

Diving is as close as your door with reefs starting just at the end of the pier. Diving facilities are not on the premises, but diving can easily be arranged with any of the larger resort hotels.

A little farther south is BONAIRE BEACH BUNGALOWS. With seven units, each has two bedrooms and kitchen. As an option, shopping can be arranged prior to your arrival so your refrigerator is full of foods you have selected when you step in the door.

Directly on the shore, two short docks extend into the sea from the large sun-deck to make access simple. **Roy's Choice**, a colorful coral garden with friendly fish, is just out front. At the end of one pier, a barbecue pit is available to guests at any time.

Diving equipment rental is prearranged through Carib Inn's dive shop. When groups of three or more dive together, one of Bruce Bowker's boats will pick you up at your pier.

BONAIRE SUNSET VILLAS is at the end of bungalow row. Also at ocean-side, its curved archways give a nice feeling of space. Beds of pastel flowers are planted around the swaying palms. One and three bedroom apartments are available by the day, week or month.

Again, diving is as close as your door. Equipment and boat diving are arranged through Carib Inn, making it easy to have a great deal more freedom and creature comforts while seeing the best diving the island has to offer.

All the villas on bungalow row are not far from the wreck site of the **Hilma Hooker**, probably the only large freighter that can be dived easily from shore. Marked by several bright orange buoys, the site can be seen near the ironshore out by the salt pans. Lying on its side, it is nestled against the reef on a sandy seafloor almost exactly 100 feet down. Fish swim up and down its flat bottom and sponges grow right beside its prop. It's the perfect dive to top a near perfect dive island.

Getting to Bonaire is easy. ALM Antillean Airlines flies direct from Miami each weekend. Connecting flights can be arranged from Miami or New York between ALM and ABC Commuter Airlines via the sister islands of Aruba and Curacao. Eastern Airlines also offers daily service from Miami to Curacao.

Bonaire seems to have the ability to add some sort of magnetic polarization to your soul after only one visit. Once here, you will be drawn toward her whenever dive vacations are planned. One magazine article called it the "boomerang effect." Maybe it's the clear, calm water. Maybe it's the lush corals and sponges, maybe the wind. Maybe it's the chibi chibis. Who knows? It's all of them, but you'll never know for sure until you come. >

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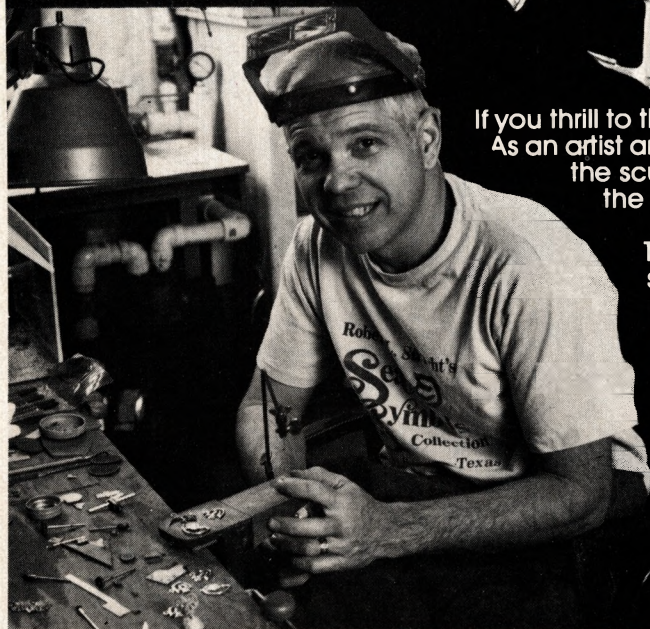
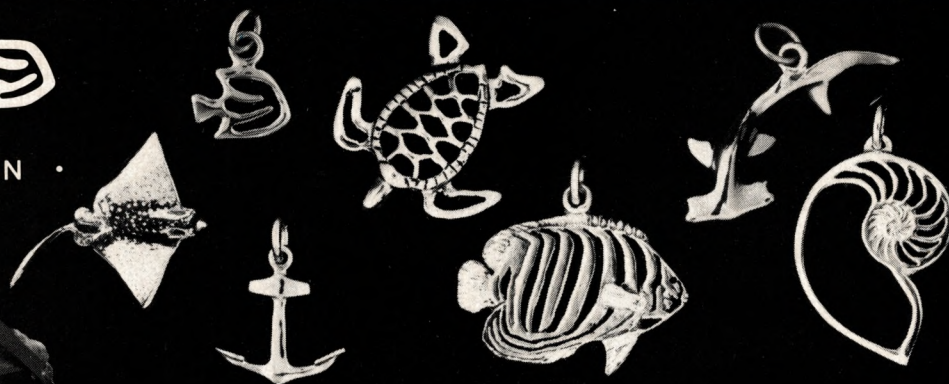
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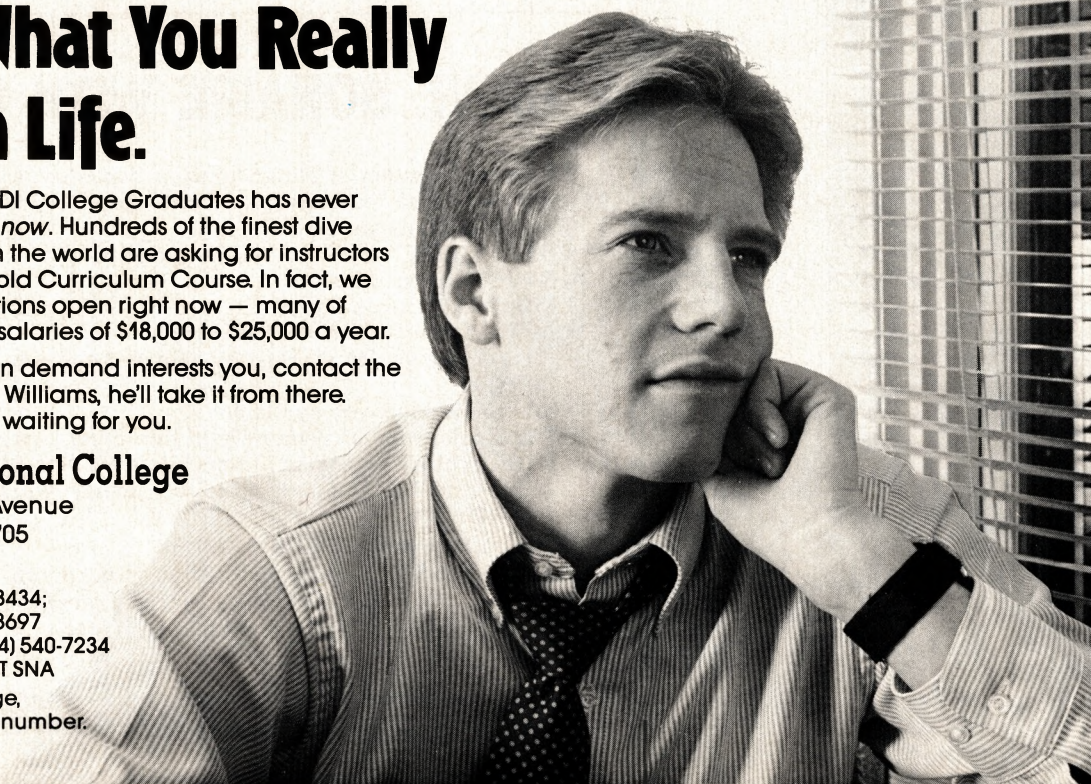
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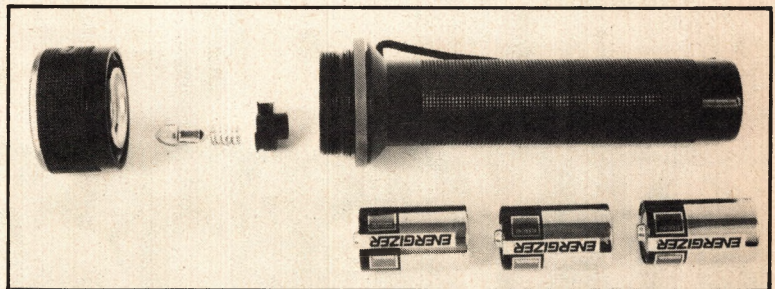
The Search I

Dacor's Plain Vanilla Dive Light

TEXT AND PHOTOGRAPHY
BY GERI MURPHY



Dacor's Search I dive light features a simple, rugged design. It is powered by three D-cells and uses a standard GE PR 3 bulb—resulting in 10-15 hours of burn time. A twist of the O-ring sealed bezel turns it on or off. An adjustable wrist lanyard is standard.



Remember the rock-and-roll era of the 1960s when everyone carried a three cell flashlight in the glove compartment of their car? Those were the good old days, when you bought one flashlight to last a lifetime and never had to fuss with it.

Well, if you are a diver seeking a good old-fashioned underwater light, Dacor has what you want. Using modern high-tech design and production methods, the company has redesigned the traditional three cell flashlight.

Ruggedly constructed and simple to operate, the Search I can be stored away for years and will still operate with a simple twist of the wrist. A set of fresh batteries provides many hours of continuous use. It's nothing fancy—just plain vanilla, designed the old-fashioned way.

Consider first the simplicity of design. Search I is cylindrical with the main body measuring 1.75 inches in diameter. It fits the hand comfortably and will not cause cramping if held for long periods.

The light is slightly under 10 inches long but large enough to hold three standard D-cell batteries. Yes, the light will fit into the glove compartment of your car—we checked!

The case is in two basic parts—the body and the front bezel. The body is a one piece, molded unit with a threaded front end and a dynamic O-ring seal. The

bezel is one and one-half inches long and threaded to screw onto the front of the body. The bezel is the only moving part on the light. A few more points about the bezel: It is larger in diameter (1.6 inches) than the case and contains the entire light bulb/reflector assembly. The reflector has a two inch diameter and its bulb fits into a simple bayonet mount.

While the light looks standard, there is a high-tech twist to it. One is immediately struck by the absence of outside controls. There are no push buttons, rotary switches or slide switches on the exterior. How do you turn it on? Simply rotate the front bezel. Screwing the bezel clockwise all the way turns on the light. Backing it off a half-turn turns the light off.

The main body is primarily a tube with a knurled exterior finish. However, the interior of the tube is ribbed with eight molded longitudinal stringers for extra strength under pressure. The light is designed to operate to depths of 300 feet. Incidentally, that knurled exterior finish offers a positive grip, especially when wearing wetsuit gloves.

The case and bezel are a high impact ABS plastic. This is an extremely sturdy material. The front port is a clear polycarbonate plastic lens that is equally tough.

The primary advantage of the Search I is that it operates on standard D-cells.

This size battery is one of the oldest and most widely available in the world today. Just about every drugstore, supermarket and hardware store carries it. The best thing about D-cells is that they can be stored for long periods of time and still provide instant electrical energy. It is not uncommon for D-cells to remain unused for years and still function.

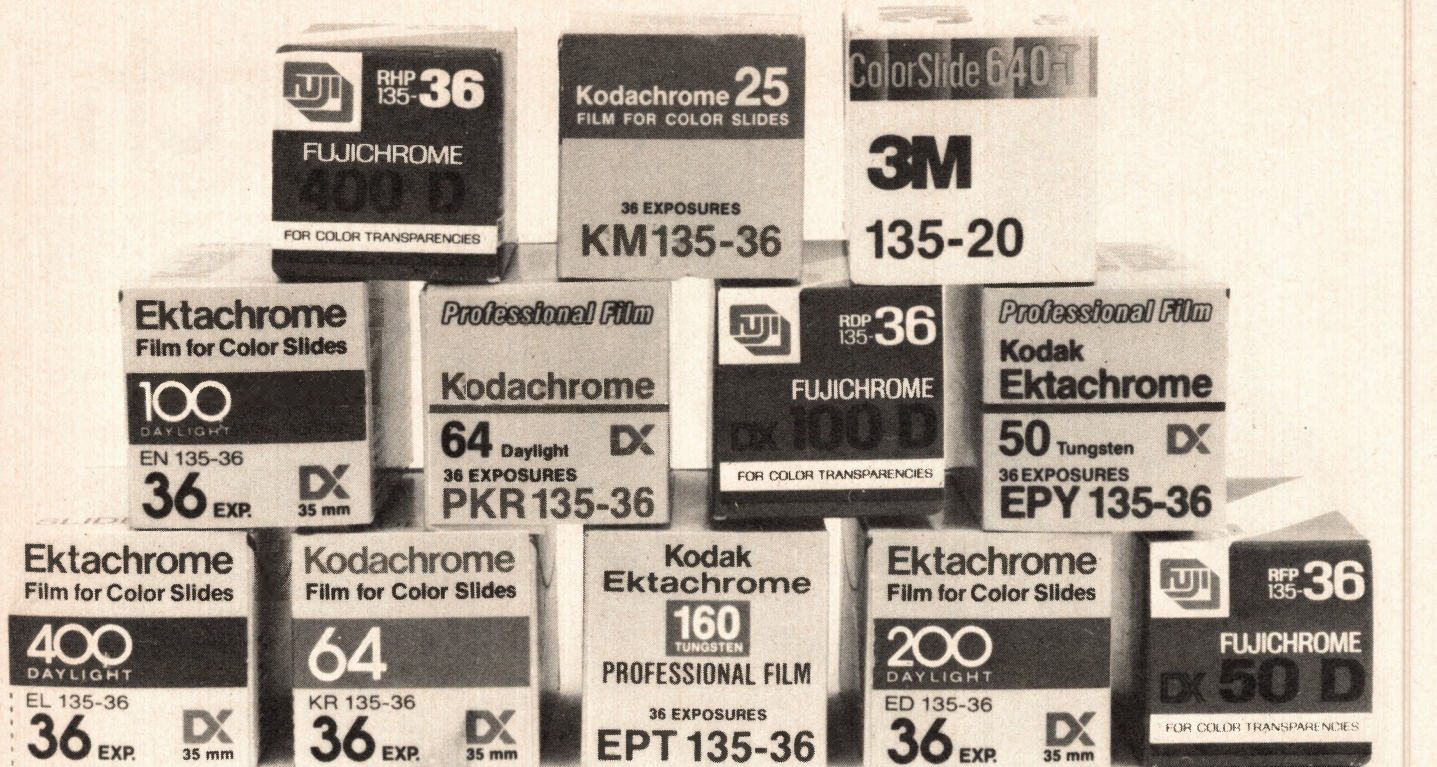
If the batteries are fresh, you can expect 10 to 15 hours of light. This equates to a week's worth of night dives in Bonaire or one-half year of normal use on local dives.

The light operates on a standard GE PR 3 bulb, which offers the same long term performance. The estimated bulb life is 10 to 15 hours and replacements are inexpensive. This bulb can be found in most places where you buy D-cells.

SDM's test of the Search I can be summarized in one statement: It works, and it keeps on working for a long, long time. We experienced no leakage, no malfunction, no problems.

The light weighs 1.2 pounds out of the water and is close to neutrally buoyant in salt water. It floats beam up.

The Search I retails for \$19.95. For information about it and Dacor's line of seven other dive lights, see your local dive store or write to: Dacor Corp., 161 Northfield Rd., Northfield, IL 60093.



ISO=ASA/DIN

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

Sooner or later, you will look at a film box, film instruction sheet, camera manual or the instructions for your new strobe and be confronted with a bunch of letters and numbers that tell you about film speeds. In fact, most film manufacturers include these numbers in the names of their films—such as Fujichrome 50 or Ektachrome P800/1600. If you wonder what these strange numbers mean, this article is for you.

WHAT IS A FILM SPEED?

A film speed isn't how fast the film zips through your motor-drive, it is a way of expressing how much light is required for a proper exposure when you photograph a subject of average brightness and reflectance. The greater the amount of light required, the lower the film speed and the slower the film. The less light required, the higher the film speed.

Film manufacturers use systems of letters and numbers to tell you the film speed rating (just how sensitive the film is to light). Some typical ratings are: ASA 64, ISO 64, ISO/ASA 64, DIN 19, ISO 200/24 or EI 80. Don't panic, we will explain what these mean. The letters stand for the group that devised the numbering system or for the name of the system used. The numbers designate the film speed. Let's examine each of the above film speed systems.

ASA FILM SPEEDS

ASA film speeds have been used for years in the U.S. (ASA is the abbreviation for the American Standards Association, the former name of the American National Standards Institute.) The ASA film speed numbering system works like this: Each time film speed number is doubled, the film requires half as much light for an

exposure. Some typical ASA ratings are: 25, 50, 100 and 200. Each time the ASA rating (film speed number) is doubled, you can close the aperture by one f/stop, or double the shutter speed. Film manufacturers usually make a variety of films with different speeds.

"Just how sensitive to light is any particular ASA film speed?" you might ask. To give you a "feeling" for film speed, imagine you are standing outdoors on a sunny day with the sun behind you. You are going to photograph an average subject frontlighted by the unobscured sun. If the correct exposure was f/16 at 1/25 second, the film speed would be ASA 25. If the correct exposure was f/16 at 1/1000 second, the film speed would be ASA 1000. This is called the "f/16 rule." With the ASA system, the film speed rating is equal to the shutter speed you would use with f/16 for a bright sunlight

picture of an average subject.

ISO FILM SPEEDS

This will be easy. The ISO (International Standards Organization) film speed ratings are identical to the ASA film speed ratings. Thus, if you understand ASA film speeds, you automatically understand ISO film speeds.

When the ISO system appeared, there was some confusion. Some manufacturers stayed with ASA for awhile, while others leaped to ISO immediately. Some straddle the fence by using ASA/ISO. The bottom line is this: Film speeds expressed as ASA, ISO or ASA/ISO are all the same.

DIN FILM SPEEDS

DIN (the Deutsche Industrie Norm) is a German film speed system used in Europe. It "agrees" with the ASA system at number 12, but differs from there. Starting at DIN 12, each time the DIN film speed increases by three units, the film needs half as much light for an exposure. As examples, DIN 12, 15, 18 and 21

reaches the film.

Lots of U/W photographers bracket their exposures by changing the ISO film speed settings, so what's the problem? It's simply that some authors refer to any film speed setting—other than the one recommended by the film manufacturer—as an EI film speed. In the above example, ISO 100 film was exposed at EI 125.

CHOOSING A FILM SPEED

Slow films have ISO speeds of 50 or less and are often used U/W for close-up photography with powerful strobe lighting. Slow films can be used at longer distances in bright, shallow water, but usually don't allow an aperture wide enough for sufficient depth of field.

Medium speed films have ISO speeds between 50 and 200, with 64 and 100 being the most commonly used for U/W photography. Medium-speed films are popular for close-ups as well as longer distances in reasonably bright water. ISO 100 film is often best with 35mm lenses (on 35mm cameras) because ISO 64 may not give enough depth of field.

Often, film speed is included in the name of the film, printed on the front or side of the box, such as Ektachrome 100 or Fujichrome 50 (opposite page). However, the speed is always printed on the rear of the film box, such as ISO 50/18° (left). These numbers can appear confusing, yet are very easy to understand, once explained.



equal ASA/ISO 12, 25, 50 and 100.

DIN film speeds are commonly expressed two ways: (1) The letters and number may both be used, such as DIN 24 or 24 DIN, or (2) the DIN film speed may be added onto an ISO film speed with a slash and a degree sign. The rating ISO 200/24°, for example, stands for ISO 200 and DIN 24.

EI FILM SPEEDS.

Suppose you wished to use a film speed rating other than that specified by the manufacturer. For example, if you wished to deliberately underexpose ISO 100 film by one-third of an f/stop, you could simply set your automatic exposure control for ISO 125. Now, because the meter "thinks" you are using 125 film (which is more sensitive to light than 100 film) the automatic exposure control will make sure that one-third stop less light

Fast films have ISO speeds of 200 to 800 and are usually used for dim conditions, such as wreck photography in 50 to 80 feet of Caribbean water. In brighter waters, fast films allow you to use faster shutter speeds if you are photographing moving subjects with sunlight.

Ultrafast films have ISO speeds faster than 800. These films are designed for extreme low-light conditions such as in deep water or on dark days. Kodak P800/1600 is a special fast/ultrafast film designed to be exposed and processed for speeds of either ISO 800 or 1600. And, although not recommended by Kodak, it can also be exposed for ISO 3200.

As a rule, choose the lowest speed film that will allow you to use acceptable apertures (for sharpness and depth of field) and shutter speeds (for sharpness). This will give you finer grain, better contrast and better color saturation.

GRAIN AND FILM SPEEDS

There are several side effects to making films with different light sensitivities. To understand this, it helps to know a little about how film works. Although an oversimplification, basically an image is made on film when light strikes tiny silver halide grains in the emulsion. When developed, these grains turn black. Small grains require more light to transform them than do larger grains. Thus, slow speed films have a larger percentage of smaller grains and high speed films have a larger percentage of larger grains.

Grain size determines contrast—the amount of detail in the dark and light areas of the picture. If the film has high contrast, dark areas tend to go darker and light areas tend to go lighter than they normally appear. If the film has low contrast, dark areas don't tend to be as dark and light areas don't tend to be quite so light.

Because the grains of slow films are smaller and more uniform in size, they tend to react to light in an all-or-nothing fashion. Thus, slow films tend to have more contrast than fast films. The mixture of small and large grains of fast films reacts to light differently. Because the small grains require more light than the large grains, the light response range is greater. Thus, contrast between dark and light areas is reduced.

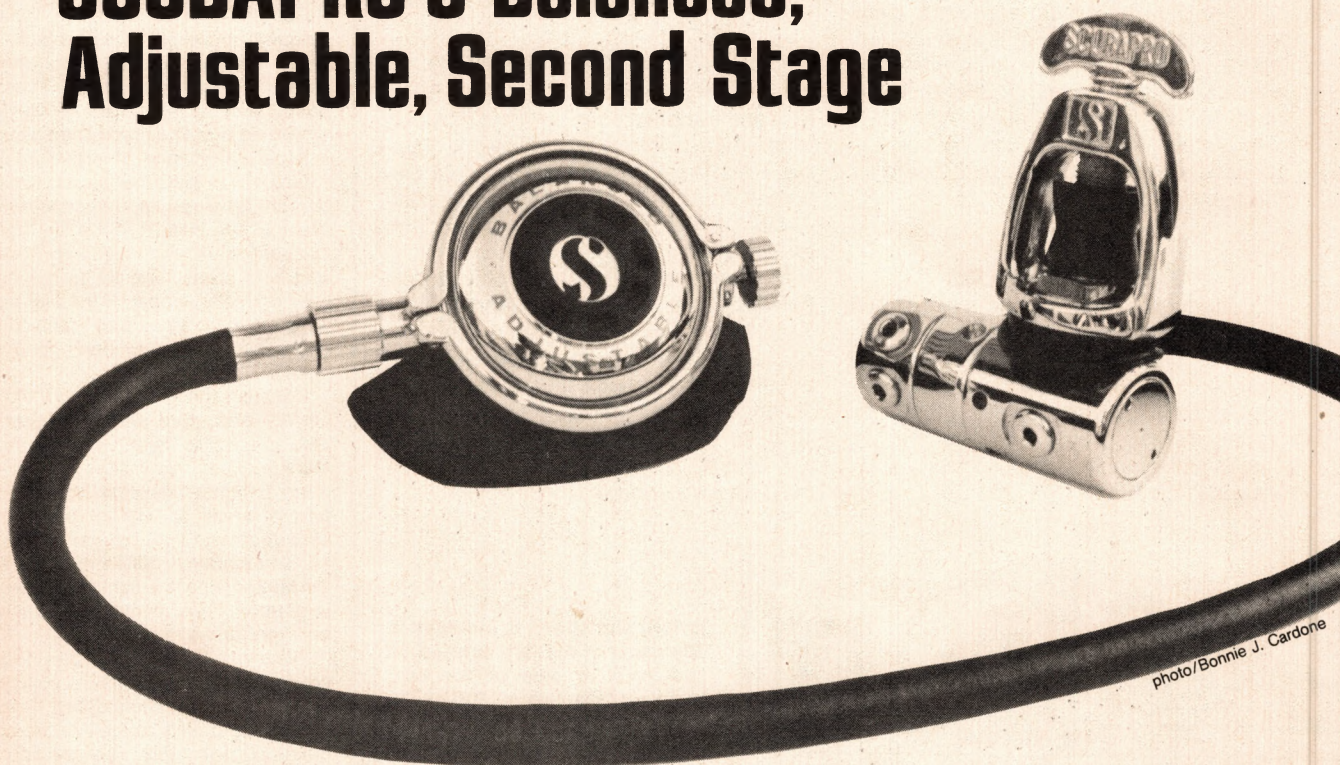
Films with small grains have better resolving power, which means sharper pictures. The larger grains of fast films can't record fine details as well as the smaller grains of slow films. The fine lines of a plume worm look fuzzy with high speed films, but look very sharp with fine grain films. The finer the detail you wish to record, the finer grain film you must use.

In addition to grain size, the distribution of the different sized grains is important. If the grains are randomly distributed within the emulsion of the film they can form clumps. Wherever grains clump together, the image is denser. Wherever there are empty spaces, density is reduced. In a large print, you actually see clumps and open spaces. You see this unevenness as graininess. Generally, the faster the film the larger the grain and the greater the graininess.

Newer films show less graininess because of several new technologies that make the grain pattern more uniform. Kodak, for example, has developed a "T-grain" structure and Fuji has developed a two phase system they refer to as their L-coupler and UDG (uniformly developing grain). These technologies provide more even distribution of the different sized grains so that the film appears finer grained, sharper and more colorful.

Film Speed Rating	Definition
ISO	International Standards Organization
ASA	American Standards Association
DIN	Deutsche Industrie Norm

SDM SPECIAL SERIES ON REGULATORS

SCUBAPRO'S Balanced,
Adjustable, Second Stage

photo/Bonnie J. Cardone

TEXT AND PHOTOGRAPHY BY ERIC HANAUER

Sometimes manufacturers move too quickly when trying to update their products. The result can be that the consumer winds up with something totally passe within a year. A few companies, however, take a long range view when improvements are made, a view that allows their new products to work hand in hand with the old ones. Although this policy requires more skillful engineering and is more costly, companies that follow it are usually rewarded by a high degree of customer loyalty.

Scubapro is such a company. Changes in its products are usually evolutionary rather than revolutionary, and when they do occur, the older models do not become obsolete. A case in point is the new Balanced Adjustable Second Stage. It updates the Adjustable Second Stage, which has been a Scubapro standby for 20 years. The older model can even be retrofitted to the new specifications with a \$25 kit.

Actually, Scubapro's original goal was merely to produce an upgrade kit that would provide the venerable regulator with a new lease on life in the form of eas-

ier breathing. However, as engineer Dean Garraffa got into the project, he realized that the kit created an entirely new product. His bosses agreed and the Balanced Adjustable is the result.

Scubapro sells its first and second stages separately, so customers can mix and match to meet their needs and bank accounts. Four different first stages and five second stages are available, resulting in 17 possible combinations. A few of them aren't really feasible—for example, mating the economy Mark III first stage with a high performance AIR I. But, discounting mismatches, there are 13 popular combinations, far more than are available from any other manufacturer. For our test, the Balanced Adjustable was mated with a Mark X first stage.

Introduced in 1984, the Mark X shares top-of-the-line status with Scubapro's Mark VII. It is usually used with high performance second stages when the Mark VII's audio alarm feature is not desired. A balanced piston design, the Mark X has two high pressure ports and five low pressure ports on a swivel cap. Like all Scubapro regulators, it has the silicone

protected environmental cap (SPEC). The spring chamber is filled with silicone grease, which keeps water out for low maintenance, lubrication of moving parts and freeze protection.

The Mark X is a downsized version of the Mark V, which has earned a work-horse reputation since its introduction in 1965. Besides being 2.7 ounces lighter, the Mark X delivers more airflow at low tank pressures. At 300 psi, it delivers 2,067 liters per minute—more than any Scubapro regulator. (Its mechanical twin, the Mark IX, equals that performance.) It sells for \$119, compared with \$115 for the Mark V and the Mark IX (which has no swivel cap). Therefore, a diver can decide among these three first stages on the basis of specifications rather than price. Engineer Garraffa considers the Mark X the ideal first stage for the Balanced Adjustable.

When the adjustable second stage was introduced in 1965, many people questioned its usefulness. Why would a diver ever want anything less than the easiest possible breathing? Actually, there are several circumstances that can make

more breathing resistance desirable. For example, when used as an octopus, an easy breathing regulator has a tendency to freeflow. The same holds true when going through surf or heavy currents. Also, when the diver is working upside down, the freeflow tendency is reduced significantly when the adjustment screw is cranked down. Any time the diver wants to reduce accidental loss of air caused by bumping and handling, the adjustment screw should be turned clockwise. For normal use, turn it counterclockwise, just short of the freeflow point.

The new Balanced Adjustable continues the features of the old standby, but offers improved breathing performance by means of a new balanced downstream valve. To explain how it works, let us first review the mechanics of a downstream second stage: The single hose regulator balances air pressure inside the breathing chamber with outside water pressure. This occurs because as the water pressure increases it pushes in on the soft rubber diaphragm. This moves a lever, which moves a soft rubber seat (the poppet) away from a sharp edged orifice, which the air flows past. The poppet valve remains open until the two pressures balance or equalize. The poppet is held against the orifice by a spring and is "downstream" from the air source. If the water pressure decreases, the excess air inside the case merely exits through the purge valve. This automatic balancing effect constantly adjusts the pressure inside the breathing chamber so it is always equal to the ambient pressure.

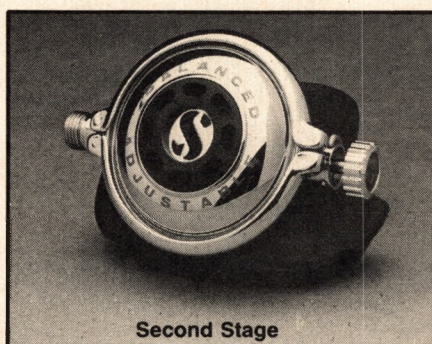
The poppet is balanced by sealing it against the incoming air at both ends. Since the diameter of the poppet is about the same at the orifice end and the O-ring end, there is no large, net force to open or close the valve; therefore it is pneumatically balanced. By making a very slight diameter difference between the orifice end and the O-ring end of the poppet, the valve will be slightly biased to the downstream side for safety in the event of a first stage pressure surge.

The most obvious effect of a balanced second stage is easier breathing, without the temperamental characteristics often associated with high performance second stages. Dean Garraffa describes the Balanced Adjustable as a "fast Chevy," compared with the AIR I, Scubapro's "Porsche." This one won't freeflow at high pressure, but the same high performance breathing will come through even when the tank air is below 1,000 psi. Another benefit of the balanced design is that the life of the poppet is increased because a much lighter spring is required to keep it closed. Therefore it is less likely

to take a set. Garraffa, however, still recommends using the little blue storage key to keep pressure off the poppet when the regulator is not being used.

Cosmetically, the Balanced Adjustable has a new splined knob that matches the nut attaching the hose to the regulator. Its name is engraved on the shiny chromed brass face. The new front cover is included in the update kit, but not the new splined knob.

We tested the Balanced Adjustable at Catalina Island off Captain Eddie Tsukimura's *Golden Doubloon*. At more than 100 feet, I couldn't outbreathe it during hard swimming. It easily provided all the air I needed. I was unable to make it leak, despite using it in positions divers nor-



Second Stage



First Stage

mally would never assume. Like all Scubapro regulators, the Balanced Adjustable breathes extremely dry, but doesn't cause a cotton mouth feeling. During hard, sudden inhalations, a fine water mist was present. Clearing was easily done with a tiny puff of air or a blast from the purge button, with no residual droplets left. Even at low tank pressure, the same easy breathing characteristics were maintained.

With the adjustment set for the easiest breathing, the regulator freeflowed on a head-first descent, but it stopped when the screw was moved a half turn. When removed from the mouth with the regulator full of air, there was a gentle but persistent freeflow. This can also be tuned out, but it stops on its own when the second stage drops to a vertical position.

The Balanced Adjustable is a calm, smooth regulator that you can just put on your tank and ignore because there will be no surprises. It doesn't breathe as easily as Scubapro's the AIR I, but is very stable and consistent throughout a wide range of tank pressures and depths. It carries a limited lifetime warranty on all parts except the mouthpiece and the sintered filter. The retail price of the second stage is \$200. It is also available as an octopus, with a 32 inch hose, orange mouthpiece and exhaust tee, for the

same price. The Mark X first stage costs an additional \$119. Owners of the old Adjustable Second Stage can have an update kit installed at their Scubapro dealer for \$25. For further information contact your dive store or the manufacturer: Scubapro, 3105 E. Harcourt, Rancho Dominguez, CA 90221.

MARK X FIRST STAGE

Type	Balanced piston
Materials	Chrome plated brass body Teflon seat
Weight	31 ounces
High pressure ports	Two
Low pressure ports	Five on swivel cap
Intermediate pressure	128-140 psi
Flow at 2,000 psi	80 scfm (2,265 liters/minute)
Flow at 300 psi	73 scfm (2,067 liters/minute)
Environmental protection	Standard
Warranty	Limited lifetime
Price of first stage	\$119

BALANCED ADJUSTABLE SECOND STAGE

Type	Balanced downstream poppet
Materials	Chrome plated brass case Silicone diaphragm and exhaust valve Neoprene seat
Weight (without hoses)	12 ounces
Average flow	32.5 scfm (920 liters/minute)
Average inhalation resistance (surface)	Adjustable from 1.2-2.5" of water
Average exhalation resistance	0.6" of water
Hose length	28"
Available as octopus with a 32" hose	
Price of second stage	\$200
Price as tested	\$319

ORCA EDGE

update

TEXT AND PHOTOGRAPHY
BY GERI MURPHY

In January 1983, a small Pennsylvania company introduced a radically new diving instrument called the Edge. The name of the product was an acronym for Electronic Diving Guide.

The Edge was the first lightweight, mobile, underwater computer to be introduced to the American diving market. It was truly ahead of its time since personal computers had not yet become as popular and widespread as they are today. In 1983, recreational divers were still reluctant about mixing delicate electronic instruments with sea water.

To complicate matters, Orca was a company brand new to diving. The founders were unknown to the industry and therefore suspect.

Add to this marketing challenge yet another handicap: The Edge computer's program was based on an entirely new and unique concept of multi-level decompression. While sport diving was based on the U.S. Navy tables, Orca had chosen an entirely different principle. The Edge had three strikes against it before the first unit hit the water.

Given these marketing hurdles, could the Edge succeed? The answer is a resounding yes! During the last three years, the Edge has proven to be an extremely reliable and useful diving instrument. Those who use one swear by it and the instrument's safety record is impressive.

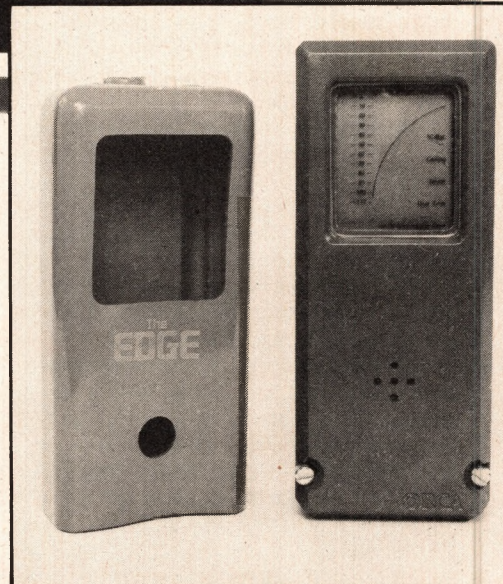
Orca has had its share of problems,

but most of them have been business and manufacturing oriented. In the beginning, the small company struggled with limited production capabilities. They could only build 20 to 30 units per month, while dive stores were clamoring for a much greater supply. Back orders mounted as customer tempers rose.

Then there was the problem of obtaining parts and chips from the microprocessor manufacturers. This occurred during the big "chip crunch" when a small company like Orca had difficulty attracting the attention of chip makers who were busy taking orders for millions of units.

The company was also under-financed and cash flow became a problem. In the end, it was the Edge that pulled Orca through its difficult times. The product was just too good to die.

Today, Orca has been refinanced and moved from Fraser, Pennsylvania to



The Edge is a lightweight underwater dive computer. It operates on a single nine volt battery and comes in a padded carrying case (above). It can be worn on the wrist or, with the optional holster, attached to the pressure gauge hose.

Newark, Delaware. The company has new production facilities, greater manufacturing capabilities and better delivery than ever before. And, as a testimonial to their dedication, the original founders, Craig Barshinger and Jim Fulton, are still with the company.

In the July 1983 issue, SKIN DIVER published a four page report on the Edge. It was written by Dr. Bruce Bassett, internationally known diving physiologist. He described the Edge as a revolutionary electronic device that may change the destiny of divers. Since that early report, there have been numerous improvements in the product.

Perhaps the best news is that the battery life has been greatly extended. The first few units ran approximately 12 hours

before the battery gave out. Today, Orca guarantees a minimum of 48 hours running time on a fresh battery. However, some Edge owners are reporting 70 to 80 hours, depending on water temperature. The warmer the water, the longer the battery will last.

Orca has improved the electronic performance of the Edge by installing special gold plated circuit boards. The new circuitry helps to produce brighter LCD contrast in the display window and ensures higher reliability.

Orca has also improved the viewing screen. The new LCD screens have a brighter imagery and a slightly wider angle of viewing.

One of the early problems with the Edge was saltwater corrosion and pitting

of the outer case. Orca had chosen a cast aluminum housing for high durability and protection of the electronics package. Orca now runs each case through a five step process that includes casting, machining, metal impregnation, anodizing and final high-tech paint process with electrostatic powder coating.

One thing that has not changed over the years is the software computer program contained in the Edge. It is still the same algorithm developed by Craig Barshinger and Karl Huggins. Orca estimates more than 40,000 dives have been made on the 1,500 Edge units currently in the hands of sport divers.

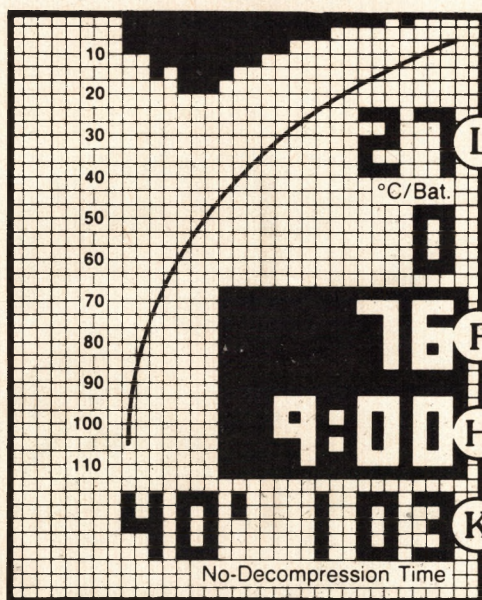
Precisely what does the Edge do? That is a question that is difficult to answer in simple terms. The uninitiated diver sometimes has difficulty grasping the full power and advantages of this unique instrument. In fact, explaining the Edge has been Orca's greatest challenge.

In technical terms, the Edge is a miniature, independent dive computer that can be worn on either the diver's forearm or pressure gauge hose (with Edge holster). I prefer wearing it on my arm, to avoid banging the instrument on the bottom.

The Edge is a totally automatic, non-programmable computer with 15 separate functions. In other words, it does all the work and you get to watch. I must confess that watching the Edge can become a fascinating preoccupation.

The Edge behaves like an instructor, telling you what to do and when to do it. This machine has a personality!

When switched on, the first thing the Edge tells you is "Read the manual before using." Sound familiar? After that, the screen displays five rows of numbers. Most of them start the dive as zeros ex-



ON THE SURFACE

L Temperature & low battery indicator

F Maximum depth of dive

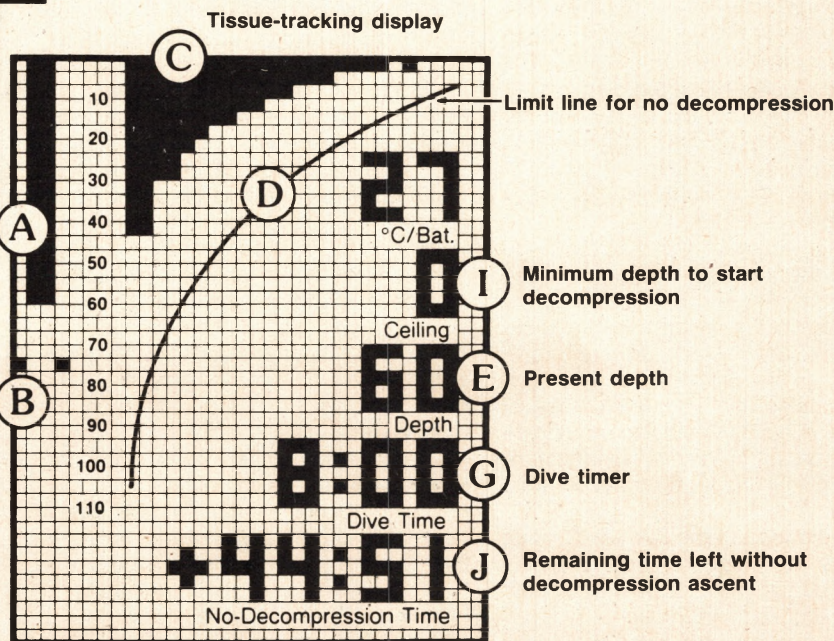
H Surface interval time

K Depth & time allowed for repetitive dive

Depth bar indicator

Maximum depth of dive

The Edge offers topside readouts (above) that reflect the changes in maximum depth/bottom times (for your next dive) as you out-gas. Underwater readouts (right) include a variety of digital information and a graphic display of tissue saturation.



WHILE DIVING

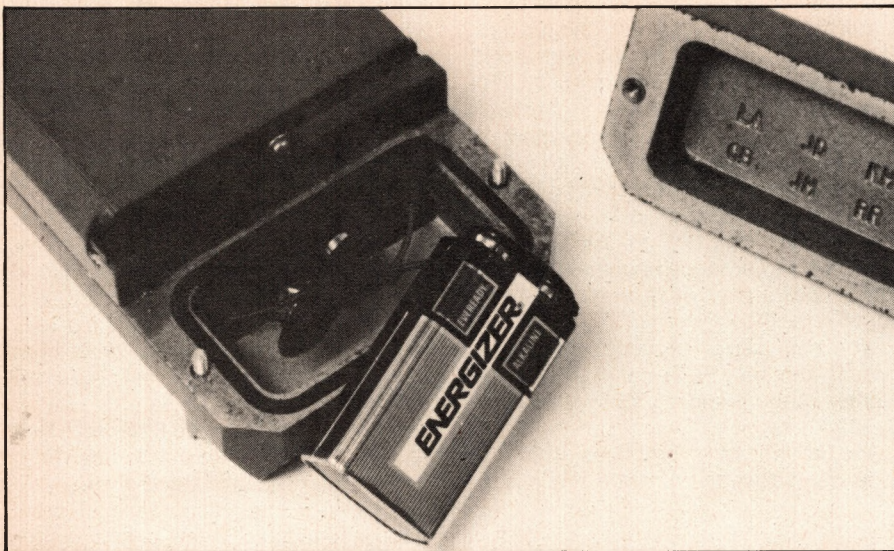
Limit line for no decompression

I Minimum depth to start decompression

E Present depth

G Dive timer

J Remaining time left without decompression ascent



The Edge features a cast aluminum housing that goes through a five step process, including anodizing and electrostatic powder coating. The battery compartment is O-ring sealed and features twin connectors for switching batteries without losing data.

cept for the top and the bottom rows.

The top row states the temperature in Celsius, a piece of information you may never wish to know, but this provides a clue as to how long the batteries are going to last. This number is replaced by a warning when battery energy gets low. Four hours prior to the battery going completely dead, the Edge flashes the message "Lo."

Perhaps the most fascinating part of the display is the bottom row of numbers, which change every three seconds: The Edge automatically scrolls the no-decompression tables. It states the maximum bottom times for depths ranging from 30 to 150 feet.

Upon entering the water, the Edge automatically starts timing your dive when you descend below 6.6 feet. All kinds of things begin to appear in the display window. A bar graph on the left side of the display records your descent. The depth is also displayed as a digital readout in the third row. The fourth row indicates bottom time in minutes.

The most fascinating part of the Edge display is the accumulation of dot-sized black squares in the upper left portion of the screen. This is called a tissue-tracking display. Each black square represents a small amount of nitrogen gas that has been absorbed into the tissues of your body. A solid curved line running diagonally across the display window represents the limit line for a no-decompression ascent.

The whole idea of the Edge is to keep those little black squares from crossing over the curved line. "Edge watching" could become a sport in itself.

When the squares get close to the limit line it is time to start up. If the dots cross

over the Line, the Edge presents another automatic warning, in the form of an arrow pointing toward the surface. The instrument is communicating its displeasure about unsafe diving procedures.

Once the diver begins ascending, the depth bar indicator shrinks. However, it leaves a double dot indicating maximum depth reached. If the diver has exceeded the no-decompression limits, a number larger than zero will appear on the second row. This display is called the ceiling and refers to the minimum depth level for decompression. If the diver rises beyond the ceiling limit, the edge will display a very large and angry message reading, "Danger Descend Now" with a broad black arrow pointing down. It definitely has the personality of a scuba instructor.

Once the diver is back on the surface, the Edge begins automatically timing the surface interval on the fourth row. This display alternates with a digital readout of the maximum depth and maximum time of the last dive. This is a display of white numbers on a black background.

During the surface period, the Edge gets very clever by continuously tracking surface time and recomputing the no-decompression limits for the next dive. The longer you stay on the surface, the greater the bottom time for the next dive. The repetitive dive limits are shown on the bottom line.

The Edge becomes a very close personal consultant for the entire day of diving, plus 12 hours after the last dive. I have even caught some divers talking to their Edge as though it were a person.

The biggest benefit of the Edge is its unique decompression program. It is a multi-level program that records and integrates nitrogen absorption for a wide va-

riety of times/depths during the same dive. The Edge is continually calculating and recalculating nitrogen absorption regardless of whether you go up, down or remain at the same level for the entire dive. The benefit is longer bottom times with less decompression penalty.

The best news is that the Edge has remained at a retail price of \$595, even though each unit is pretty much handmade and performance tested. The plastic holster is \$20 extra. There is a special limited edition of the Edge that features a solid machined aluminum case with the owner's name engraved on the face. It sells for \$675.

For more information, contact your local dive store or Jim Fulton at: Orca Industries Inc., 495 Bellevue Road., Diamond State Industrial Park, Newark, Delaware 19713. >>>

The Edge has a low profile and can be worn comfortably on a diver's forearm.



THE EDGE

Case construction	Cast aluminum
View window	Mineral glass
Dimensions	7.2 x 2.9 x 1.3"
Weight (with battery)	1.5 pounds
Battery power	9 volt alkaline
Min. running time	48 hours
Battery door	Aluminum/2 screws
Battery door seal	.033 square ring gasket
On/off switch	Magnetic flip type
Low Battery indicator	4 hour warning
Display	LCD
Display configuration	34 x 40 square dot matrix
Display illumination	Ambient light

FLORIDA SOUTHLAND

GREATER MIAMI • FORT LAUDERDALE AND THE BEACHES

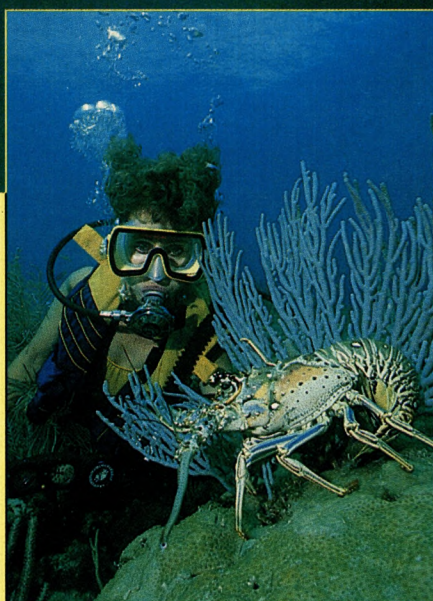


WRECK OF THE LADY FREE

STEVE LUCAS PHOTO

Fabulous South Florida

The Largest Concentration Of Easily Diveable Wrecks In The U.S.



Top: A diver explores the wreck of the sailboat, *Lady Free*, in 50 feet of water. **Above:** Janice Lucas takes a look at a lobster. These animals are plentiful on Miami/Fort Lauderdale reefs, but it is the wrecks littering the seafloor, including some immense freighters, that offer the most thrills.



TEXT AND PHOTOGRAPHY BY STEVE LUCAS

The sun's rays pierce the grave sites with an eerie flicker. Filtered of its warmth, only the cool deep blue remains as it bounces from the sandy floor of the watery tombs. Freighters, tugs, sailboats, houseboats and shrimpers; they litter the seafloor of this golden coast. Their backs broken, steel plates shattered and hulls splintered, they form a derelict fleet—a fleet of ghosts.

All along the Greater Miami and Fort Lauderdale coasts lie the remains of nearly two dozen ships. The largest concentrated collection of easily diveable wrecks in the hemisphere, most are intact, colorfully encrusted and swarming with life.

One of the most popular vacation areas in Florida, this wreck-strewn coastline is frequently passed over by diving tourists as they drive an hour or two far-

ther to the Keys. Although wreck exploration is one of the most popular pastimes of sport divers, in comparison to the number that visit the state's reefs, only a small percentage of the half million or more divers who enjoy Florida's waters annually ever experience this magnificent conglomeration of ghost ships.

With high energy scenes shown weekly on NBC's *Miami Vice* and a new detective series currently in production on Fort Lauderdale's famous "strip," tourism is booming. Portrayed with a healthy splash of glittery pizzazz, South Florida is hot! Jet and seaplanes from the cities' two international airports zip past grand skylines. Marinas with million dollar yachts sparkle at night and entice vacationers. Rows of glittering white cruise ships line Miami and Fort Lauderdale seaports. Silky sails billow from colorful catama-

rans as they glide along emerald bays dotted with windsurfers.

Miami and Fort Lauderdale each have dozens of specialized parks and day trips that vie for attention. Each offers enough to keep a family happy for weeks.

On Key Biscayne, Miami's out-island with a lighthouse, it is easy to believe you can drive all the way to the Caribbean. On Virginia Key, next to Key Biscayne, you can get a glimpse of what the tropical Atlantic is all about at Miami's Seaquarium. Talented dolphins, including Flipper, and a killer whale perform daily.

Across the street at Planet Ocean, the world's largest marine science museum, you can see and feel the wrath of a hurricane or the cold of an iceberg.

Just south of Miami, near the Florida Turnpike, Miami Metro Zoo gives you Asia, Europe, Africa and South America in a single afternoon.

Many other attractions make it fun to plan a family vacation. The Everglades National Park, Biscayne National Park, Parrot Jungle with its hundreds of uncaged free-flying parrots and Monkey Jungle, where you are in the cage and the monkeys run free to stare at you, are open year-round.

In Fort Lauderdale, take a dinner or river cruise on the *Jungle Queen*, *Paddle Wheel Queen*, *Miss Ocean World*, or *Hidden Harbor Show Boat*. Visit the Swimming Hall of Fame where Olympic hopefuls work on their style and champions are immortalized. Body surf in an artificial ocean or free fall down one of several twisting and careening water slides at Six Flags Atlantis. Ocean World offers dancing and leaping porpoises, sharks, alligators, coral reef displays, birds, and more.

In addition to exciting wrecks, Miami and Fort Lauderdale have excellent reef populations, extensions of the same reefs that border the Florida Keys. Contrary to popular belief, the islands and diving do not end at Key Largo. There are numerous isolated keys between Miami and the Upper Keys, most with excellent reef formations. All that is lacking is the branching corals such as elkhorn. Many other reef builders proliferate, including brain and staghorn. Fish life is virtually the same and the concentration of lobster is often better. The sponges that decorate the southern reefs are often more prolific. Rotund, reddish brown barrel sponges, up to two or three feet high, as well as small pink vase sponges, are common.

A number of reefs are within the boundaries of the Biscayne National Park. **Pacific, Ajax, Long, Triumph and Star** are all in this protected area. South of Key Biscayne, well marked by an enormous ocean lighthouse, **Fowey** is very popular with its shallow coral formation. The line continues north, with reefs such as **Emerald**, off Key Biscayne, and **Hammerhead, Barracuda** and others near Fort Lauderdale.

But the real attraction to this coast is its wrecks, especially those immense giant

DIVE THE MERCEDES 1

From the
HOLIDAY INN
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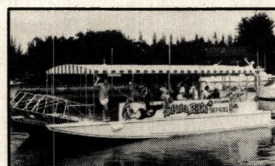
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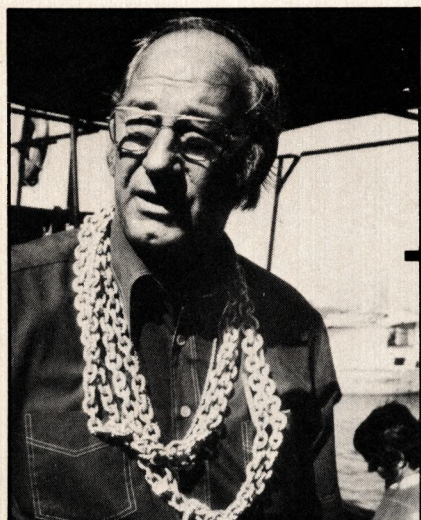


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FLORIDA SOUTHLAND

freighters that are almost perfectly intact and sitting upright on the seafloor. Several agencies are involved in the planning and placement of these artificial reefs. In Miami, the Metro-Dade Department of Environmental Resources Management (DERM) and in Fort Lauderdale, the Broward County Artificial Reef Association, carefully select each location and vessel to serve their primary goals: the creation of artificial habitats for fish and recreational areas for diving and fishing.

In depths exceeding 40 or 50 feet, the reef systems tend to flatten out and have little relief. Cover for larger game fish or smaller deepwater tropicals is often sparse. Many of the ships that sit in the Miami River or Lauderdale's Port Everglades are no longer seaworthy. The responsible agencies work with the owners of the derelict ships or go through the courts to make necessary arrangements and fill out the mounds of papers necessary to sink a vessel.

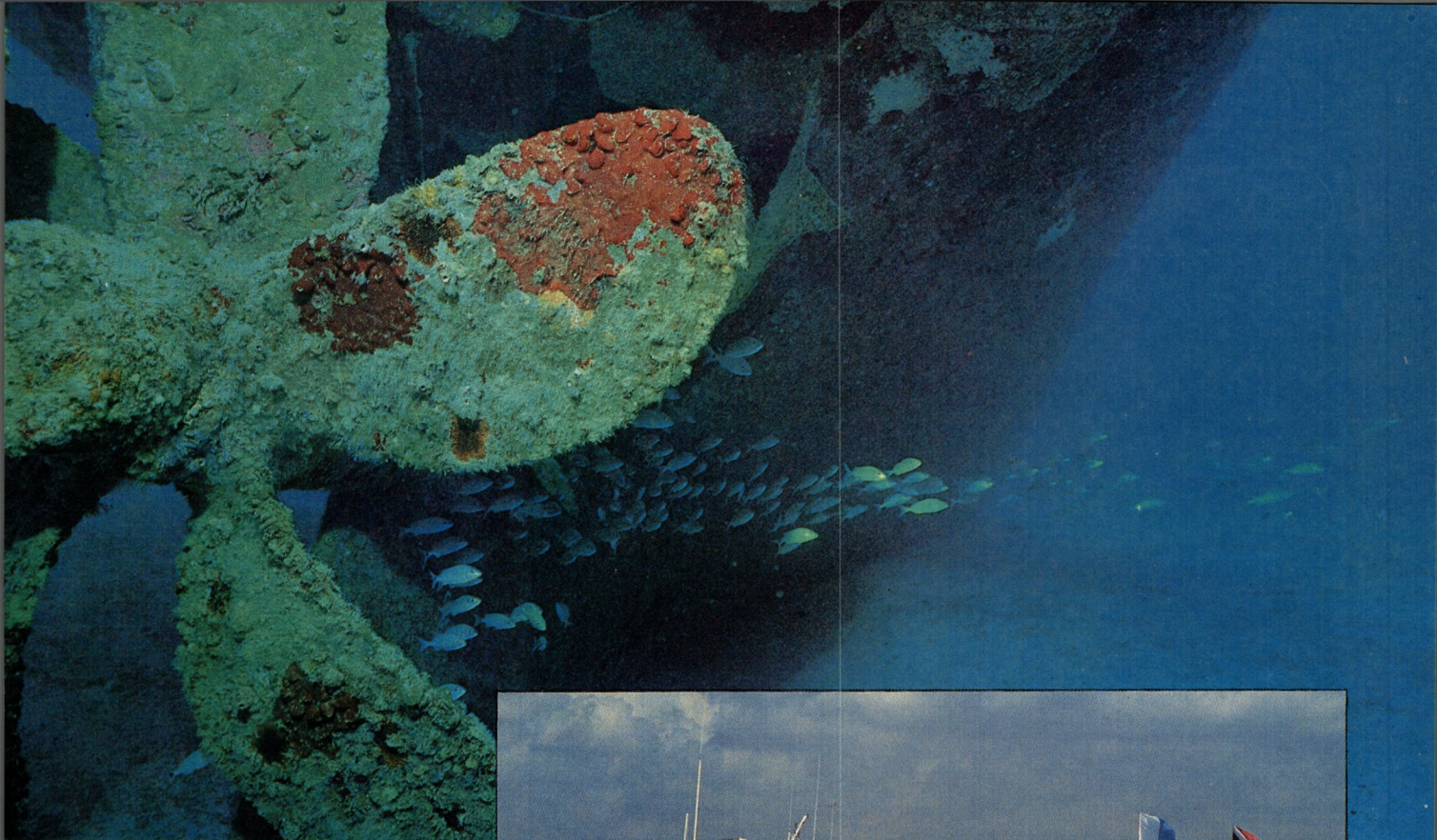
To date, Miami has the largest concentration of wrecks owing to an aggressive artificial reef program administered by DERM. Over a dozen sizable ships now sit on the ocean floor, most in depths of less than 100 feet.

One of the best, the 200 foot **Al-mirante**, was sunk by organized fishermen. In 125 feet of water, it can be found east of Elliot Key near Homestead. It is 100 feet to its deck. The wreck is overgrown with soft corals and sponges and is cruised by large schools of jack and snapper. Tiny damsels, divided top and bottom with bright yellows and blues, combine with the riot of colors to give the impression you are in a tropical lagoon somewhere in the South Pacific.

Just south of Fowey, the 175 foot freighter **Blue Fire** sits upright, its mast broken to the starboard side at 105 feet. One of the most spectacular of the South Florida wreck fleet, the **Blue Fire** is home to thousands of silvery baitfish, who work their way from bow to stern along its deck at 90 feet, constantly pursued by large barracuda and jack.

Not far away, the 210 foot **Ultra Freeze** sits in 120 feet of water. With its wheelhouse only 70 feet below the surface, it, too, has incredible fish populations. On its bow, its now useless winches have hundreds of feet of steel cable coiled as if ready to unload cargo.

East of Key Biscayne, several ships are concentrated in depths from 50 to 130 feet. The **Lady Free**, a wooden sailboat, sits on a 50 foot deep sand desert looking like a pirate ship, its bowsprit still entangled with rope netting. Large barracuda have taken up residence beneath its length. Schools of grunts hover along-



North of the *Biscayne* sits a pair of ships, the remains of the Woolworth yacht **South Seas** and a broken freighter, the **Arida**. The 170 foot *South Seas* sits on a barren sand flat just more than 70 feet down.

The 165 foot *Arida* is badly broken and turned on its starboard side. Home to thousands of fish of several dozen varieties, it is in less than 90 feet of water.



Top: The huge propeller of the *Proteus*. Above: The *Deep Diver* off Miami.

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In 135 feet, the 210 foot **Deep Freeze** is one of the oldest of the fleet. At 105 feet, the deck's cargo holds are filled with fish. Near the bow, two ladders climb to

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an upper foredeck where an enormous encrusted winch sits on the port side.

Fort Lauderdale's sites are made up of several newly sunk freighters, an old tug, several barges and others. The most colorful is the old **Houseboat**. Eighty feet down for more than 20 years, she is encrusted with sponges and gorgonians.

The wrecks of the tug **Trio Bravo**, the **Cumberland**, and the **Cement Ship** are very popular, although some are quite shallow and have limited visibility. A 10,000 pound **Freighter Anchor**, apparently lost from a large ship that ventured too close to shore, lies in less than 30 feet. Its 200 foot chain runs across the reef and makes an excellent photo prop.

A new wreck, the **Rebel**, was sunk in mid-summer, 1985. One hundred fifty feet in length, it sits in 110 feet of water. It is 85 feet to the decks and fish life is just beginning to find the location.

The most famous of all the area's wrecks is without question the **Mercedes**. One hundred ninety-seven feet long, its stern sits in just over 90 feet of water with the bow at 100 feet. A derelict freighter that came to rest on a Palm Beach millionaire's beach one Thanksgiving night, it became the talk of the nightly news for several months before finally being freed at enormous state expense. Once it was refloated, the Broward wreck agency quickly negotiated with

the salvors to have the *Mercedes* towed to Port Everglades, where local dive organizations volunteered their time to ready it for sinking. Sunk adjacent to a lively reef less than a year ago, it has already established itself as one of the

most popular wrecks in the state.

The wrecks are destined to contribute to the popularity of the Gold Coast. As more divers discover this fleet of ghosts it is certain to become one of Florida's most dived regions.

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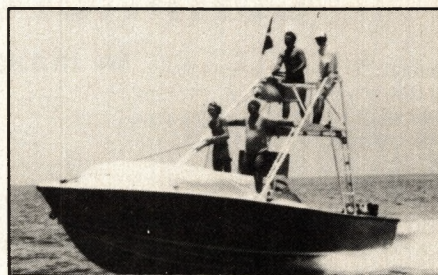
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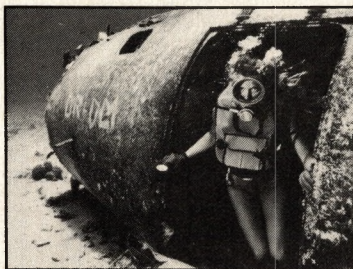


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photos/Courtney Platt, Budd Riker

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New Series Highlights The Extraordinary Exploits Of Ordinary People

BY JACK MCKENNEY

"This works really well when we have two normal people of about 170 pounds sitting in here," Alan Whitfield said. The PC 8 submarine pilot, he directed that remark to Ron Kipp and me during our first submarine ride while filming a television segment for a new true-life adventure series.

The three-man PC 8, one of a number of mini-subs based throughout the Carib-

bean belonging to Research Submersibles Limited, was the co-star of our production. Ron Kipp, who owns and operates Bob Soto's Diving Services in Grand Cayman, was the featured personality. At six feet and 235 pounds, Ron found it no easy feat to change positions with me, my 16mm camera and tape recorder.

The PC 8 was definitely not designed for musical chairs. But we finally made

the seat changes and while Ron scrunched into the tail section of the tiny sub, I took his spot by the large front window to film his point of view of the old anchor and treasure.

John Wassel, an independent film director, my assistant Budd Riker, co-owner of Divers West dive shop in Pasadena, and I arrived in Georgetown with 20 boxes

(Continued on Page 120)

NOW

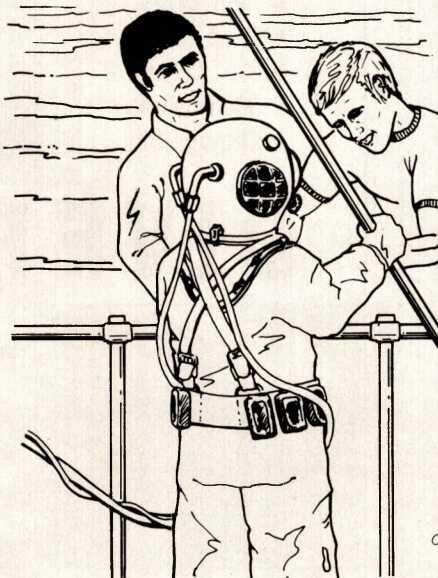
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SECTION

GALAPAGOS **A Journey into** **Another Time**

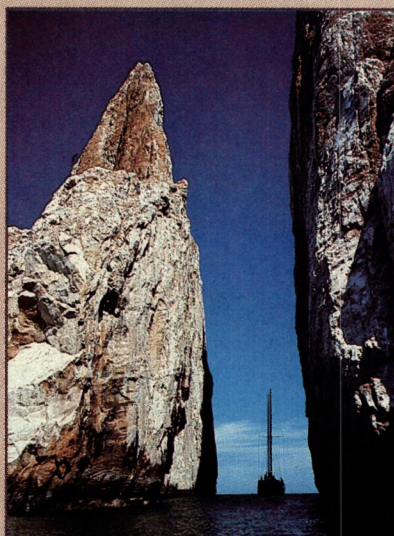
TEXT AND PHOTOGRAPHY
BY CARL ROESSLER

Of all the world's great dive destinations, one is so different it stands apart. This unique adventure is the Galapagos Islands, made famous by the intellectual pyrotechnics of Charles Darwin, which shook the foundations of biological theory.

Born five to ten million years ago in a cataclysm of volcanic eruption, the Galapagos is a scattered chain of massive, weathered craters. They are 600 miles due west of Guayaquil, Ecuador, directly on the equator. Despite their location, the waters here are cool (62-67°F), since the Humboldt Current (which originates near Antarctica) flows directly through the Galapagos.

When the Galapagos' seismic delivery had ended, there were 50 islands dotting thousands of miles of open ocean. At first they were totally barren, a biological clean slate.

Over the eons, flotsam and jetsam washed up on the islands' pristine flanks. Some of this debris originated in the rivers of western Ecuador, Peru and Chile—tree trunks with insects, lizards, even birds, which drifted out to sea and were caught up in the mighty Humboldt Current. The distances were not so great: The Galapagos lie but 600 miles from the South American mainland. The time adrift also was not a crucial element in the process; but what the chance survivors encountered when they touched shore was. Everywhere else in the world, life follows a law piquantly summarized by Robert Ingersoll: "In nature there are neither rewards nor punishments. There are only consequences." These



ocean-tossed survivors might have landed on any other shore and found their lifespan measured in minutes at the hands of local predators. Yet here, upon these basalt monuments amid empty sea and sky, the local population offered no threat.

In a situation unique in the world, any species that landed on the Galapagos found no natural predators and few competitors.

The long term result was an exotic Eden, populated with species somewhat different from those found anywhere else. These were essentially peaceful, browsing contentedly year after year against a drowsy background of biological relaxation.

Change occurred, of course. The tortoises became giants weighing hundreds of pounds, with long necks to reach leafy branches and saddle-back shells to accommodate this style of feeding. The finches on different islands developed bills of various sizes and shapes to feed amid the shrubs and tree bark that were different on



The Galapagos Islands are inhabited by a variety of unique animals. Above: A marine iguana at Hood Island. Below: Jessica Roessler with a porcupinefish.



each island.

The young naturalist, Charles Darwin, took these and other observations and mentally crafted a theory of the origin of species that explained them—evolution.

And, what of today? The fact is, little has really changed since Darwin. Many of the scattered Galapagos are still uninhabited, their peaceful browsers still pursuing their special way of life. Man has made destructive incursions, he always does. There are feral rats and a plague of goats, but

travel

these are quibbles. From the moment you land in the Galapagos you are in a land of living magic.

See & Sea Travel of San Francisco, which celebrates its 20th year in 1986, pioneered dive travel in the Galapagos. With 13 years of experience in these islands, See & Sea offers historical perspectives to divers who wish to experience these astonishing wonders. Over the years, our groups have explored all the major dive sites. Discarding many, we have evolved a selected itinerary to show you the greatest array of underwater adventures Darwin's islands have to offer.

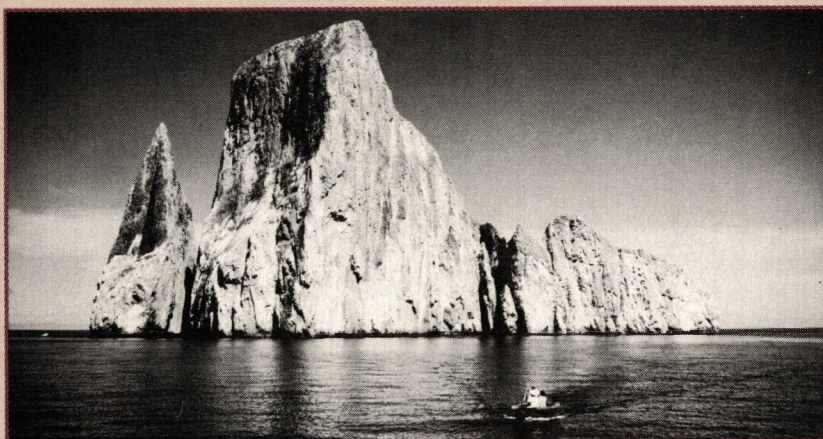
There are plunging walls of stone, pockmarked by the holes of burrowing sea urchins, past which sweep sea lions and schools of huge amberjack. I've jumped over the side and landed right next to massive loggerhead turtles. At another wonderful spot I've had repeated encounters with immense ocean sunfish. Migrating whales have soared past us, majestic leviathans of inner space.

I've found large green moray eels being cleaned by dozens of spectacularly decorated shrimp. I've had flightless cormorants swim past me underwater, flapping their scrawny wings and paddling furiously as they darted about looking for tasty shellfish. Ninety feet down, I've had penguins (penguins—on the equator!) bustle by with that waddling gait that reminds you of—penguins. I've seen immense starfish in brilliant colors; once I even spotted a porcupinefish as big as a sea lion.

Would you believe big groupers in canary yellow? How about a stone cavern filled with shimmering sunlight and sea lions with great luminous eyes, or thousands of marine iguanas plunging into the water to browse on bottom algae? Are you ready for 12,000 pairs of nesting albatross?

Galapagos adventures are a non-stop whirlwind of excitement. Not only will you visit all of the major land sites and animal colonies regular Galapagos visitors come to see, you will also average three dives per day during the 14 day cruise.

You can dive the luminous corals of



Barren Kicker Rock juts abruptly out of the sea. The rugged Galapagos offered migrating species a chance to adapt and flourish, without pressure from predators common to their native lands. Many of the species differ from island to island.

Punta Roca Vicente; you can penetrate the Devil's Crown; you can night dive the astonishing life on the volcanic sand in Tagus Cove; you can delight at turtles hiding from you by sticking their heads in crevices (Cousins Island); you may photograph the elusive wrasse-assed bass at Champion Island; you can marvel at trees of black coral in canary yellow; you may find yourself eyeball-to-eyeball with the gleaming yellow orbs of the Galapagos horned moray eel.

For photographers, the Galapagos are a bonanza beyond comparison. I've taken five groups there and shot over 100 rolls of film each time. Between the diving and the land excursions, your cameras will get an intense workout. There are majestic Galapagos hawks, bustling blue-eyed Galapagos doves, sleepy land iguanas (in yellow and tan, contrasting with the black of the marine species).

You will thrill to huge schools of white-striped angelfish and yellow-tailed surgeonfish. Then you'll rush to shore to photograph pelicans, the exotic Sally Lightfoot crabs and red-footed oystercatchers.

By now you get the idea. This is a parade of biological wonders to swamp the senses. From morning to night for 14 days you will experience a rebirth of wonder. At the end of the two-week cruise you will be ready for a rest, but the exhilaration of this unique adventure will remain with you for the rest of your life.

I've mentioned a parade of species, yet have hardly begun to call the roll of the Galapagos' awesome fauna. It

is something each traveler must experience in his or her own way.

For the past six years, See & Sea has chartered the yacht *Encantada* for these adventurous cruises. Seventy feet long, she offers five double cabins and plenty of deck space. A motor-sailer, she cruises with great stability on her overnight crossings, enabling us to dive or make land excursions first thing each day.

The Galapagos are a binge for your senses. There are stunning visual images of the islands themselves as backdrop for your pictures of animals. There is the great blue volcanic crater of Fernandina filling the horizon. Far to the east there are the 1,000 foot high white cliffs of the island the locals call the Sleeping Lion. At Punta Espinosa, the entire horizon is filled with five gigantic volcanic craters.

When you are on the beach at Fernandina you'll be told about the loudest sound ever heard on earth—when the entire floor of the ten mile crater collapsed and fell two kilometers!

In a short magazine article it is impossible to convey the awe and wonder of the mighty Galapagos; if I have given you a hint of their natural magnificence it is only a hint. You owe it to yourself to see these fantastic sights for yourself.

For further information on Galapagos cruises and related South American travel to wonders such as the lost Inca city of Macchu Picchu, contact See & Sea Travel, 680 Beach Street, Suite 340, San Francisco, CA 94109; (415) 771-0077, or (800) DIV-XPRT.

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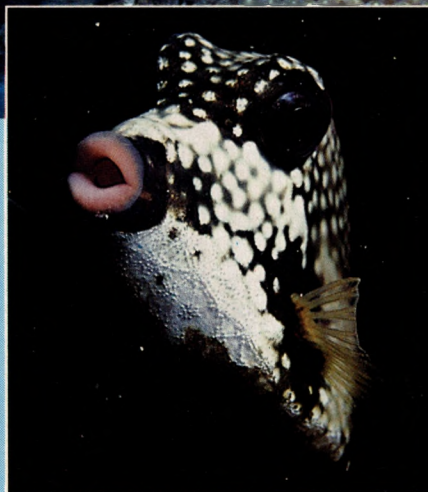
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Curacao's U/W Park

A Slice Of Paradise Preserved

BY BILL GLEASON



Above: Eel feeding. Far left: The *Superior Producer* wreck. Left: Smooth trunkfish. The Curacao Underwater Park is dedicated to the preservation of marine life and features 16 permanent moorings to protect fragile coral from anchor damage.

Photos by Bill Gleason and Geri Murphy

In June of 1985, the government of Curacao opened its Underwater Park. The careful planning and thought given to this endeavor is highly commendable for a place where dive travel has not played an important economic role. It's a shining example of how to protect reefs and fish life before the island becomes well-visited by divers. With the combination of marine attractions, hotels, beaches, restaurants, shopping, nightlife and casinos, it's a pretty fair bet Curacao will become an increasingly popular dive destination.

In the "old days" of diving, 20 years

ago—marine conservation in the Caribbean was often a case of too little, too late. After spearfishermen and black coral divers had finished with a location, sport divers completed the job by coral and shell collecting, not to mention the random karate kicks given the reefs by novices. As divers had to travel farther to more remote destinations (and in those days, Cayman, Bonaire, and the Bahamas were considered remote) in search of unspoiled diving, certain pioneers, such as Cap'n Don in Bonaire, started reef preservation programs that have become standard practice in popular dive destinations: No spearfishing; no coral collecting; moorings to prevent anchor damage; and training in buoyancy control to help prevent those damaging karate kicks.

Curacao certainly learned from this historical lesson. In the ABC (Aruba, Bonaire, Curacao) Islands in the Netherlands

Antilles (just off the South American coastline), it has long been known for its shopping, casinos, restaurants and the delightful mixture of Dutch and Caribbean culture. Most divers know about Curacao since it's a required stop on the airplane when traveling to Bonaire. Aside from a few small operations catering mostly to the learn-to-dive visitors, diving on Curacao was kept low key. Not many sites were identified and most were seldom, if ever, visited by divers. Large portions of excellent reefs remained untouched and the island continued to thrive on its general tourist trade.

Several years ago, the Curacao government began to plan the development of its dive resources. This was the conception of the underwater park, dedicated to preserving marine life. The services of Tom van't Hof, a Dutch marine biologist and staff member of STINAPA (Netherlands Antilles National Parks Foundation) were enlisted. Under his guidance, an area for the park was designated and large, permanent moorings set in place for 16 different sites. A snorkeling trail

is in pristine condition, with star and pillar in addition to the regular elkhorn, stag-horn, brain, and leaf corals. The visibility was about 80 feet, slightly down on this trip from an average of about 100.

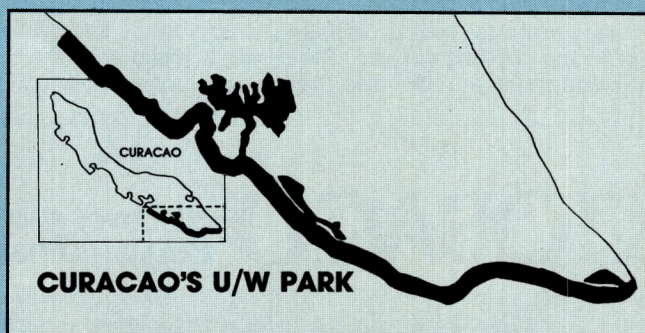
Moving west in the park, you encounter dive sites with exotic names like Baranki Karanito, Puntí Sanchi and Bapor Kibra. Most of the dive sites feature a drop-off ranging from vertical to sloping and the amount of shallow reef varies from place to place. Just about any of the sites are perfect for photographers. Tom van't Hof and Heleen Cornet produced *Guide to the Curacao Underwater Park*. This excellent booklet details each site extensively, with a complete description of a suggested dive plan and a list of features that will warm the hearts of U/W photographers and fish watchers. It's available from the Curacao Tourist Board in New York and comes highly recommended.

There are two wrecks in the park. A small tug at a site named, appropriately, Towboat, lies in about 20 feet of water and rises nearly to the surface. You can easily explore the tug in 10-15 minutes,

the wind, and you should expect a day or two of gusty (20 mph) winds. While the dive sites are usually protected, the boat rides to some can be a little rough. However, there's always a dive site within easy access on all but the roughest days. Current dive operators on Curacao are not used to handling large numbers of visitors. Don't expect the ease and efficiency of a Bahamas, Cayman or Bonaire operation for a year or two. Do expect qualified guides, friendly service and good to excellent diving. One week dive packages are being developed; see our sidebar for a list of dive operators.

The underwater park is not the only part of Curacao to dive. The island has an entire coastline just waiting to be explored. Sampling the diving on the southwest coast proved to be equally fascinating. As the number of visiting divers increases, it's nice to know the reefs and dive sites have been protected since the beginning of dive travel to Curacao. Jeff Sybesma is currently the park director, and it's his responsibility to see that the reef sites remain pristine. 

Taking the initiative for marine preservation while dive tourism to its shores is still in its infancy, the island of Curacao, in the Netherlands Antilles, just off the Venezuelan coast, has set aside 12.5 miles of coastline and adjoining waters as an U/W park.



and educational and park management programs were set up. All of this occurred before divers in any number visited Curacao.

SKIN DIVER recently toured Curacao and was delighted to find the reefs in great shape. The park is on the southeast section of the island and covers about 12.5 miles of coastline, all within easy access by car (three of the sites may be dived from shore) and boats coming from the major hotels. In general, good drop-offs and walls characterize diving in the park. The walls begin very shallow and it's not necessary to dive below 100 feet during an entire week on the island.

Musts for visiting divers are the two eastern most sites, Piedra Pretu and Bapora. The drop-off starts at 25 to 30 feet and the plunge to 130 feet is sheer. The reef is lush and dense, with black coral (60 feet), gorgonians, large seafans and tremendous sponges. Fish life is prolific, particularly on the upper part, or terrace, of the reef. Grouper, yellowtail, surgeonfish and creole wrasse abound. The coral

but there's also a good drop-off right around the point that makes a great combination dive. The second wreck, at Bapor Kibra (broken boat) is a ship that washed ashore and broke up. It is very shallow, easy to explore in calm conditions, but not a must for wreck divers. The reef at Bapor Kibra is much more exciting than the wreck and the shallow reef is covered with marine life. If you're interested in wrecks, don't miss the *Superior Producer*, just outside and to the west of the park. This is an exceptional wreck. Approximately 175 feet long, this overloaded freighter sank in 1977. Her hull intact, the ship lies in 90 feet of water (100 feet if you swim into the bottom of the open hold). The wreck sits upright on the bottom and Hollywood couldn't create a better one. The superstructure and wheelhouse are intact and easy to explore. The mast rises to 60 feet. Coral and fish abound, and visibility is often spectacular.

Curacao is directly in the path of easterly tradewinds. It lies diagonally across

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For more information about diving in Curacao, and for the excellent *Guide to the Curacao Underwater Park*, contact:

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(212) 751-8266

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330 Biscayne Blvd., Suite 806
Miami, FL 33132
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TREASURE HOT SPOTS

It Takes Patience,
Persistence And A
Little Luck

BY JAMES HULSIZER

Many divers, particularly those who live a long distance from prime underwater areas, look for something to add a new dimension to their lake or river diving. Many of them invest in underwater metal detectors.

When purchasing a metal detector the novice treasure hunter is full of visions of silver coins and gold rings popping up from the sand. He/she may find himself/herself inspired by tales of other divers

who have had success with their detectors or may think he/she knows of a virgin territory. But, unfortunately, many of these novice treasure hunters get discouraged and after only a few attempts these expensive pieces of equipment are placed in the back of a closet and forgotten or ignored.

One reason for getting discouraged is not finding anything of value. The person who has spent an entire dive digging up

nothing but bottle caps, pop tops, aluminum foil and mineralized rocks can attest to the frustration one feels. But the important thing to realize in this situation is that the diver has refined his or her recovery technique to the point that the targets giving off the signals are being recovered. That is why anyone using an underwater metal detector for recreational purposes must have patience, persistence and a little luck.

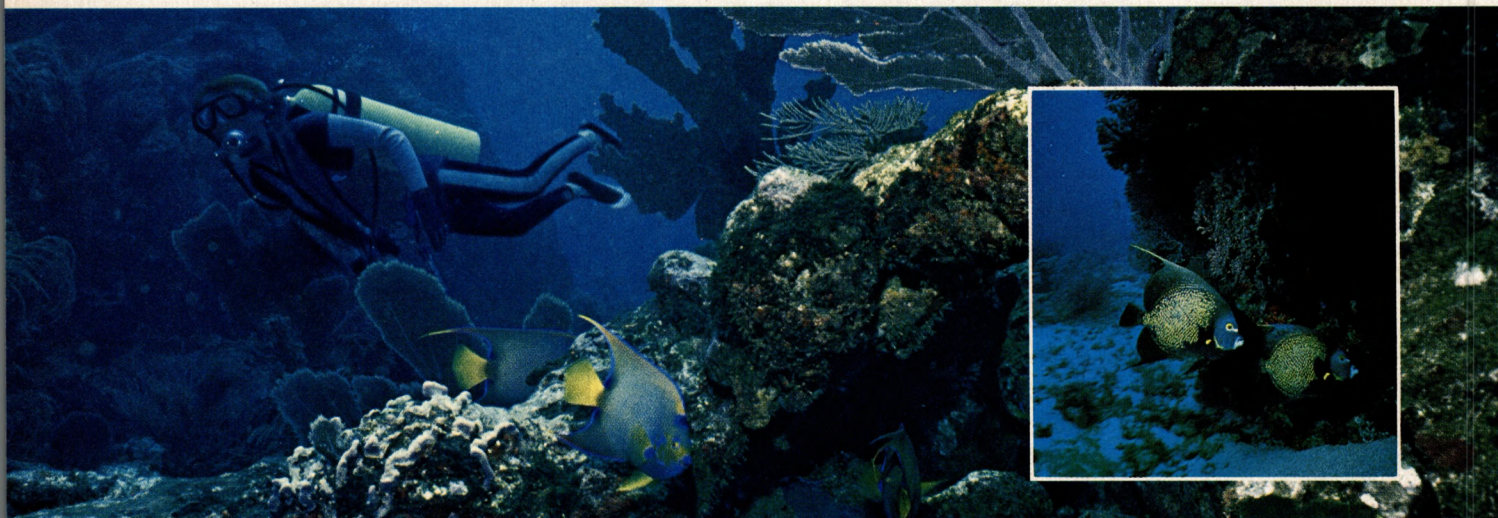
Other divers encounter a different set of problems in that they cannot find the object giving off the signal after they have started digging for it.

To tackle this problem we must go back to just after the purchase of the metal detector. No matter what type of unit is purchased it is extremely important that the novice become familiar with the controls, the function and the all-around feel of the machine.

The first function that should be mastered is tuning. This varies from one manufacturer to another, so it is best to follow the owner's manual for instructions. If there is a treasure hunting store in your area the shop owner should be willing to assist you with any questions.

Once the machine is properly tuned it is vital to find out where the "hot spot" is on the search coil. This is the area that picks up the signal best. Once you become familiar with it, it can be used to

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pinpoint the signal. The best way to find the hot spot of your machine is to take several coins and spread them out on the floor, then pass the metal detector over them. By listening to the headphones or watching the meter it can be determined where the strongest and sharpest signal is coming from. Taking some time to play with the machine is very helpful and will save time and aggravation underwater. Passing the metal detector over the coins while holding the machine at different heights is a good way to simulate the signal of a target that may be buried deeper. Remember: The closer the object is to the search coil the louder the signal will be.

Once the hot spot has been pinpointed the proper searching method may be put into use. Once again spread a few coins out on the floor and pass the metal detector over them. Move the search coil from side to side to simulate movements actually made while swimming. When the machine is passed over one of the coins it will give off a brief signal. If the simulation were the real thing, the object would be buried and you would have to pass the search coil over the target again and again to find the strongest signal. When you have the signal pinpointed, you can be sure the target is under the hot spot of the search coil. To further pinpoint the target, move the search coil forward and back over the signal rather than side to

side. This will indicate an even smaller search area. Once this method of searching has been used and mastered with the coins on the floor, try moving the coins and this time keep your eyes closed. It will become evident that targets can be recovered with little or no vision if practice and patience are applied.

Once you've become proficient with this method some consideration must be given to additional gear and gear modification to make treasure hunting easier.

One important piece of gear is a small goodie bag. There are a few features that are vital if the bag is to be used for underwater treasure hunting. It should have an easy to use opening that can be opened wide and locked shut, preferably with one hand. It should also have some sort of lanyard on it so it can be secured to the wrist or to the weightbelt. It is preferable to attach the goodie bag to a clip on the weightbelt because wrist carried bags tend to get in the way of the metal detector and set off a signal. Also make sure the mesh that makes up the goodie bag is the smallest weave possible. Remember that small objects such as earrings, dimes, small musket balls, pop tops, bottle caps and junk of all sorts will be carried in it.

A digging tool will be necessary in most areas treasure is to be found. In some cases, such as sandy beaches,

digging by hand and fanning will be all that is needed to bring the target to the surface. However, in areas with a hard pan bottom or if rocky gravel and broken glass are present, a digging tool is a must. The most common type of digging tools used by underwater treasure hunters are garden tools. A small trowel or small hoe/rake combination are the best and most economical tools for the job.

Because all underwater treasure hunters are not lucky enough to hunt on sandy beaches all of the time some thought should be given to the type of terrain that will be encountered and how it will affect your equipment. Regulators get dirtier than usual and wetsuits take a genuine beating. The most severely affected areas on a wetsuit are the knees: Kneepads can increase wetsuit life by years.

A thin pair of gloves or a pair of canvas work gloves should be considered, when not diving in cold water, to protect the hands from rocks and broken glass.

The last piece of gear to be brought along is already a part of most divers' equipment inventory: the standard size goodie bag. In most areas that treasure is found larger items are uncovered as well. Items such as bottles, plates and other assorted glassware make fine additions to anyone's trophy room.

Now that the gear is assembled and research on the treasure location has been

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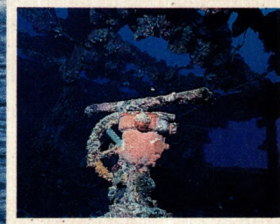
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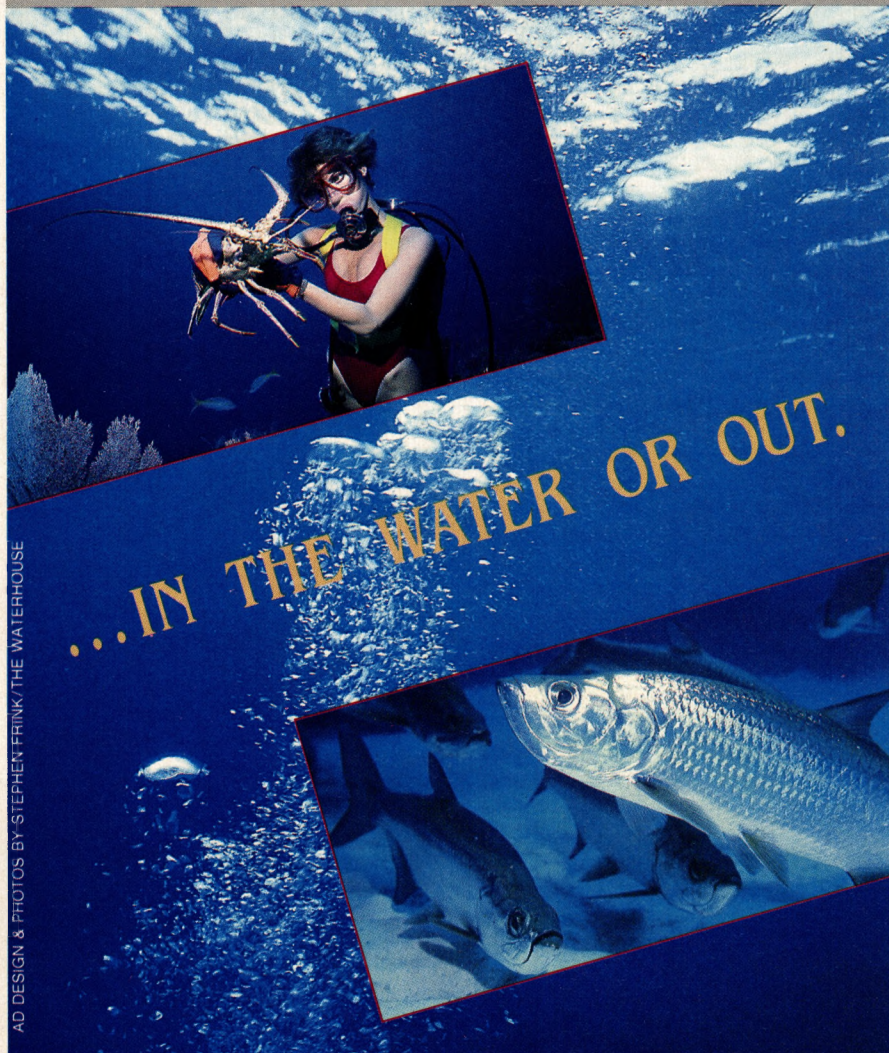
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TREASURE

completed it is time to enter the water. This is where the practice will pay off and the actual technique will be refined.

Whether you are diving from shore or from a boat the utmost care should be used entering the water. If the detector uses a headphone for an audible signal it should be tucked under the mask strap or inside the hood before entering the water. Give special attention to the hand in which the metal detector will be carried to avoid having wires cross in front of your digging hand. Remember that the openings for the wires in the headphones and in the metal detector case are very fragile and any harsh pulling on this wire may result in a leak in either the headphone or the main body of the machine.

Once in the water, settle down to the bottom and do a final check on the tuning of the machine and comfort of the gear. Once the metal detector is tuned, pass it over a metal object to check the signal. If everything checks out the search for treasure can begin.

One of the key points to remember is



Move slowly, working the metal detector from side to side. You must be familiar with your instrument to identify signals.

to move slowly. As you swim, move the metal detector from side to side. If you move it too rapidly the signal from an object may be so brief it will be missed completely. Also, if you swim too fast, a signal may be heard but by the time you can come to a full stop the target may have been overshoot and be extremely difficult to find again.

Once a signal has been located a great deal of attention to technique is necessary. Dig in a motion toward you, placing all of the sand, dirt or gravel in the same pile in front of you. With every few scoops pass the metal detector over the spot from which the signal originated. If you fail to get a signal pass the detector over the pile of sand or dirt that has been removed from the hole. If you get a signal from it, one of two recovery techniques

may be used.

If visibility allows, fan the pile of residue with a flat hand. In just a few passes the target should be uncovered. There is no greater thrill than seeing a gold ring or an old coin come to the top of a pile of sand. But there are those frustrating moments when the strong signal turns out to be a pop top or bottle cap. Before moving, pass the metal detector over the area again as there may have been more than one object in the same spot.

It is necessary to bring all signal emitting objects to the surface and dispose of them properly. Aside from doing a good deed in cleaning up a certain body of water you will be saved the aggravation of digging up the same piece of junk twice.

If visibility is so poor you would not be able to see the object if the fanning method were used, another method must be employed. This method uses the metal detector and the goodie bag together.

Once the target has been moved use the hand not holding the metal detector to pick up a small portion of the pile in front of you. Then pass the search coil over the hand holding the residue. If no signal is emitted discard the residue and try another small amount. If a signal is received from the residue in hand, close the hand, put it all the way inside your goodie bag, then open it up. No rings or wrist jewelry should be worn as these may give off false readings.

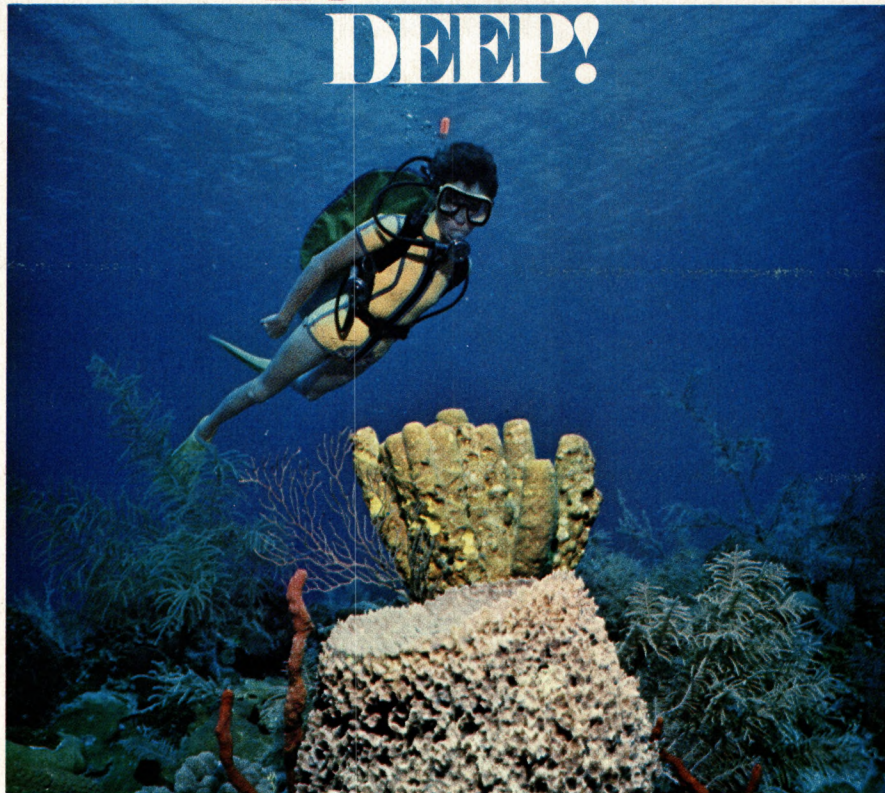
Using either of these recovery methods should produce results but only patience and researching your hunting areas can increase your chances.

After surfacing with the day's finds it is important to take care of them immediately, especially when diving in salt water. An item that has been submerged in this for a long period of time should be kept in a container of it until the object can be properly treated. This usually consists of soaking the object in fresh water for an extended period of time. Objects found in fresh water may require no special treatment or may need minor electrolysis. In either case it is advisable to coat any iron or steel object with a clear lacquer or hot paraffin wax to arrest any corrosion that may be taking place. Any treatment of your finds should take place as soon as possible because most corrosion will accelerate greatly once the object is exposed to air.

Most present day treasure hunters are not scuba divers. This restricts them to the shore or only as deep as they can wade. Many of the areas that only a scuba diver can reach are going to produce fine results. By combining proper research, persistence and a little luck any treasure hunter should produce results. But do keep two things in mind: It is difficult to find once popular areas that have remained untouched by the modern day treasure hunter. On the other hand, keep in mind that there is no such thing as a site being completely hunted out.

Get wet and don't give up! 

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Fantasea Cruise

A Magic Carpet Tour Of The Red Sea Reefs

TEXT AND PHOTOGRAPHY BY AMOS NACHOUM

"Absolutely the most beautiful reef we have ever dived!" is Alese Pechter's log entry for Thomas Reef. Alese and her husband, Mort, are underwater photo-journalists from Long Island, New York. They have dived all over the world, but the Red Sea remains their favorite destination. I understand their excitement. As a native Israeli, I have been diving the Red Sea all my life and taking groups of American divers there for almost ten years.

"The Red Sea reefs are spectacular, but the super wreck dives were the real surprise," recalls freelance scuba journalist and novelist Mark Dorfman. "There are two great wrecks. The *Dunraven* sank more than 100 years ago. The hull is rotted open—an easy penetration and spectacular environment. The *Jolanda*, at Ras Muhammed, has been down only a few years. The sea's just started to reclaim her. She's still intact, but her jagged steel hull already hosts spectacular soft coral colonies. There are several open hatchways covered by shimmering, fluid, mercurial schools of glassy sweepers."

My own favorite site is Ras Muhammed, an elaborate formation of three submerged islands at the southern tip of the Sinai where the gulfs of Suez and Eilat join the Red Sea. Along the rugged windward wall of the north pinnacle are massive schools of bohars, jacks, barracuda, tuna and reef fish. Often they are joined by hammerhead sharks, eagle rays, mantas and other visiting pelagics.

Between 50 and 80 feet are spectacular seafans, uncounted species of crinoids and a bewildering assortment of anemones. Waterfalls of cascading soft corals of every color and variety fill the wall. On the leeward side, less than 100 feet away, is the saddle, a plateau between the pinnacles. It's covered with soft corals and densely populated with reef fish. Sheltered from the currents, it's a photographer's delight. Ras Muhammed is home to a friendly family of five or more Napoleon wrasse. The big one, named George, a four foot, 300 pounder, comes around every time divers break the surface to see if they have a hard-boiled egg or other tidbit for him.

On my most recent trip to the Red Sea we did a night dive at Ras Muhammed. The north wall at that time is incredible—

one of the most intensely dramatic sights I have seen in many years of diving. The profusion of soft corals, polyps fully open, provided an overpowering display.

At several sites I found Spanish dancers—foot long, red nudibranchs with white fringe. Their wavelike movements through open water are reminiscent of flamenco dancers. At Ras Umsid I have captured *Photoblepharon*, flashlight fish. Elusive, only two to three inches long, they host symbiotic iridescent bacteria in pouches under their eyes. The *Photoblepharon*'s ability to control the pouches fascinates divers, intrigues scientists and frustrates photographers.

"God's other world," is the way underwater cinematographer Jack McKenney describes the Red Sea. Its sheer walls plunge from the surface to depths beyond reach and sight, almost beyond imagination. The walls' faces are crowded with exotic plant life and animals. Soft corals range in color from brilliant scarlets through orange and blue to deep violets. Giant seafans grow to more than 15 feet in diameter. Everywhere are profusions of exotic fish—lionfish, emperor angels, unicornfish, bannerfish, diverse species of butterflyfish and everywhere, sprinkled like gold dust, schools of golden *Anthias*.

The Red Sea averages 1,000 to 6,000 feet in depth. Locked between two great deserts—the Arabian on its east and the Sinai on its west—the Red Sea's water temperatures hover around the low to mid 70s (°F). Visibility averages 100-200 feet. The sun shines 365 days of the year. Because of its unique geological nature, its marine life includes numerous species found only in the Red Sea, a spectacular variety of flora and fauna from throughout the Indo-Pacific region and many of the pelagic fish found throughout the world.

I remain deeply convinced that the best way to experience the Red Sea is by living aboard a top quality dive boat. Today La Mer has boats at all of the world's finest exotic diving locations, but we first created the live-aboard diving concept in the Red Sea in 1978. Our flagship there, the 85 foot United States registered motor yacht *Fantasea*, is owned by Howard Rosenstein (former proprietor of the Red Sea Divers Club) and exclusively operated by La Mer. The affiliation of Howard

Rosenstein with La Mer combines more than 30 years of Red Sea diving and travel experience.

Yehuda Reich, the captain, has a special gleam in his eye when he talks about the *Fantasea*: "This is the best, most reliable boat in the Red Sea today. Last year alone, we did over 20 trips with American divers. Now, my crew of four works together like a family."

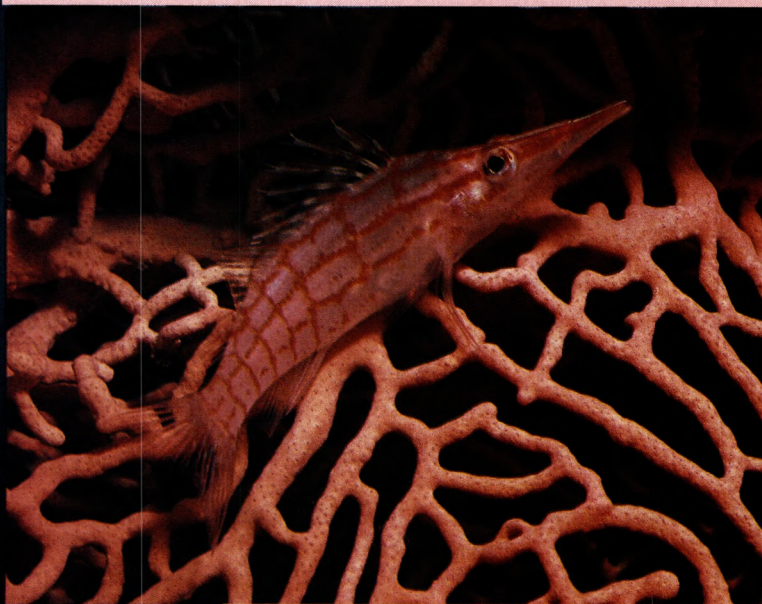
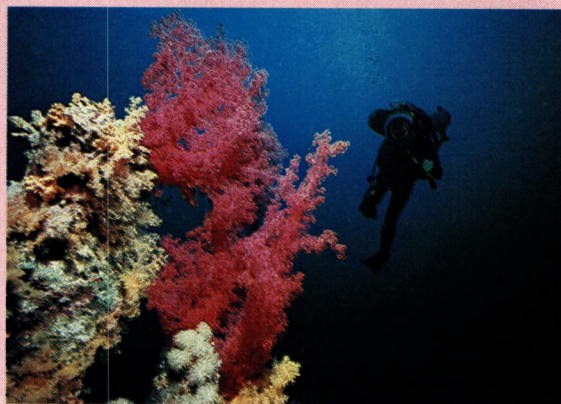
Yehuda's pride is well founded. The *Fantasea* has a lavish 1,000 square feet of sundeck and more than 800 square feet of dressing area and work space. There are five double cabins for ten divers, all with portholes and fans. The comfortable saloon is air-conditioned. The *Fantasea*'s dual compressors, full cascade system and aluminum 80 tanks guarantee ample air for the most ambitious U/W photographers and divers.

La Mer Red Sea cruises begin in Eilat and head south, ending in Sharm el-Sheikh.



"Diving activity and food are important to our guests," beams Yehuda, "so we take special care to provide them with the finest available. My dive guide is very familiar with the extravagant reef formations and their fantastically rich marine life. The meals are planned according to the day's dive schedule and there are snacks and hot soup after every dive."

While news reports tend to focus only on political tensions in the Middle East, peaceful relations between Egypt and Is-



The 85 foot, U.S. registered *Fantasea* (left) offers 1,000 square feet of sundeck, five double cabins, air-conditioned saloon, dual compressors and air bank. The vessel carries ten divers to the best sites in the Red Sea, such as Ras Muhammed, Ras Umsid, the Tiran Straits, the wreck of the *Dunraven* and reefs like Gordon, Thomas or Jackson. During the nine day cruise the divers will encounter 100-200 foot visibility, exotic tropical fish, huge pelagics such as manta rays, and colorful soft corals.

rael are safer and more comfortable than ever. Through an extensive network of contacts and the cooperation of our Egyptian representatives, immigration and other border formalities are handled with minimal inconvenience.

La Mer Red Sea expeditions begin in Jerusalem and end in Cairo. *Fantasea's* home port is Eilat, Israel, the only modern port facility in the region. Eilat gives us instant access to excellent marine maintenance facilities, outstanding provisions

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el-Sheikh and fly to Cairo to visit the pyramids and the Sphinx.

La Mer Diving Seafari, Inc. of New York is *Fantasea's* exclusive American booking agent for individuals, groups and private charters. If you want to travel in security and style, it's time for you to join us. For further information write: La Mer Diving Seafari, Inc., 823 United Nations Plaza, Suite 810, New York, NY 10017 or call (800) DIVE NOW (in New York (212) 599-0886). 🐠



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Bainbridge Sportsmen's Club

Scuba Oasis In Pennsylvania

BY CHRIS MUTCHLER

Most people believe that an oasis is found only in the desert. That's not always true. Bainbridge Sportsmen's Club, Inc., is an oasis for scuba divers, and it's not in the desert, but in the beautiful, low, rolling hills of Lancaster County in southern Pennsylvania.

With 25 acres of clear, spring-fed water, surrounded by 130 acres of lush woodland, BSC is primarily a scuba diving facility that also offers snorkeling, swimming, camping, boating and fishing. There are canoes, rowboats and paddleboats for rent or you can bring your own rafts, tubes or rowboats. For safety, no motors or sails are permitted.

The clean, blue-green water is loaded with fish, which include record bass and trout as well as bluegills, black crappies, walleyes, muskies and some huge catfish (the ever-present "quarry sharks"). Fishing is on a catch and release basis only, using barbless hooks.

As for water quality, the spring-fed limestone water offers exceptional visibility for a quarry, ranging from 30-50 feet to as much as 70 feet depending on depth and time of year. Visibility improves as the season progresses, reaching a peak in September and October. It's during these months, too, that the freshwater jellyfish make their appearance, briefly but beautifully. Ranging in size from a dime to a quarter, they sometimes float together so thickly they look like an underwater snowstorm. They have no stingers, so they're harmless.

Temperatures vary a bit at the surface, reaching the high 70s (°F) in the summer. On a hot July day, there's no feeling in the world like dipping into cool, clear springwater. Bottom figures are pretty constant at about 40°F, so below the thermals, you'll need a full wetsuit.

Depths range from a couple of feet to about 120 at the deepest spot, called "The Hole" by BSC regulars. Fifty percent of the water is less than 60 feet deep and there are several areas that are ideal for check-out dives. A 20 x 20 foot platform, submerged in 20 feet of water, provides a place for scuba classes to regroup. There are also several floating platforms scattered the length of the quarry, anchored with down-lines to buildings or other underwater attractions.

The club has had a DC-3 or similar

type aircraft (possibly a military trainer) on order for some time. It's difficult to say when it will arrive because there's a lot of paperwork involved in the transaction, but it's coming. Once it gets to BSC, it'll be disassembled, submerged and reassembled underwater for use in rescue training and other activities. There are also plans to sink several four wheeled vehicles and another boat or two during the next year.

There are two accesses to the water. Access A or "The Road" is a good launching point for your dive. Head out the road as it continues underwater. Lots of fish and an old dynamite shack are among the first things you'll see. Or visit the boat, sunk on purpose. Or look for the steamshovel they say is still down there—somewhere. Access B takes you into the



photo/Smokey Roberts

back of the quarry and a totally different dive, with grassy areas, buildings and more fish. There are large parking lots at both accesses.

The principal owners, Steve "Dax" Mutchler and William "Smokey" Roberts, coordinate operations. Both have extensive scuba experience. Roberts, an instructor, has made a wide variety of commercial and instructional dives. He has also made many underwater films, some award-winning, and has filmed at Bainbridge Sportsmen's Club. These films are available for sale or for club use. Smokey and his wife, Dottie, have been extremely helpful partners and their expertise has been invaluable.

Bainbridge Sportsmen's Club is the result of 12 years of work and planning. In 1982, the Billymer Quarry and adjacent woodlands were purchased from the J.E. Baker Company. A locally based manufacturer of limestone and dolomite products, Baker began quarrying operations during the 1800s. At the peak of production, Billymer was home to nearly 700 people who had their own school, church

(Continued on Page 80)



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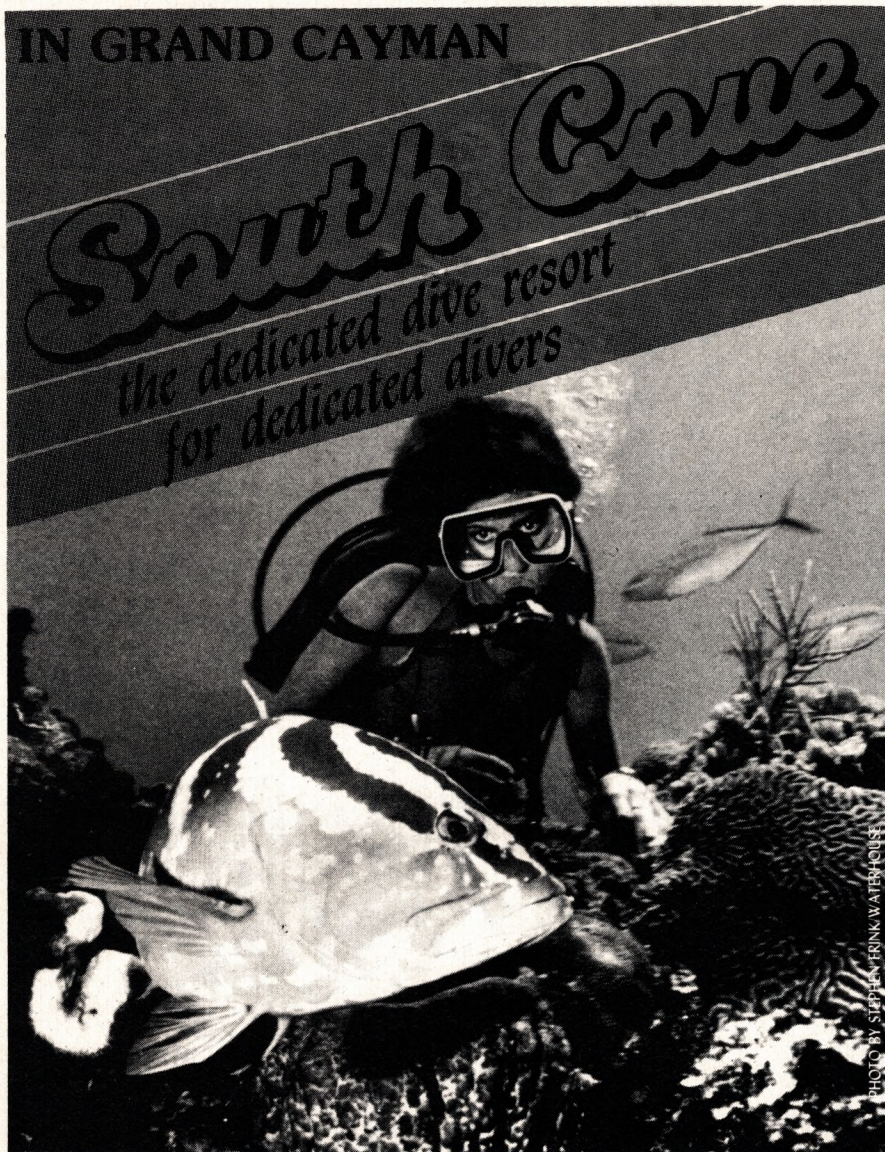
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BAINBRIDGE

(Continued from Page 76)

and general store. By the late 1950s, three major underground springs were beginning to flood the quarry. In 1961 pumping was discontinued and all quarrying activity ceased.

Now, nearly 30 years later, the houses have fallen down and the buildings are in ruin. Along the Susquehanna River, the daffodils and day lilies bloom in what used to be the front yards of the workers' houses. This is where the campsites are, some in shade and some in sunny, grassy areas. More sites are being cleared for camping, with ten acres available now. Many divers enjoy the weekend diving and camping. Fresh water is available and this year there is a brand-new shower house and restrooms.

A food stand operates on the weekends and there are several good restaurants nearby. Lancaster is only a 30 minute drive away, so you can visit Amish country and sightsee or enjoy some Pennsylvania Dutch cooking. Nissley Vineyards is also worth a visit while you're in the area. Excellent wine, tours and tastings are all available. On summer weekends Nissley's sponsors Saturday evening outdoor music, ranging from jazz to country and western. The winery is about one-half mile from BSC.

Bainbridge Sportsmen's Club is a fully certified PADI training facility in its third year of operation. There is a full-service dive shop on the premises for equipment sales and rentals. Minor repairs can be done right there. Air is available at the shop, too.

BSC is affiliated with both local and out-of-state clubs, such as York, Harrisburg and Lancaster, Baltimore and Washington. It is through this affiliation that the club sponsors several special events each year, such as the Spring Festival and U/W Easter egg hunt in May.

There is a general use fee of \$3.50 per person per day, which covers all activities. Children under six are free. Camping is available Friday and Saturday nights only, at an additional \$2.50 per person per night. Night dives can be arranged with the shop for Saturday evenings. Ask about our yearly membership plan. The club is open daily from 9:00 am to 7:00 pm, April 1 through January 1, except in April, September, October and December, when it's open weekends only.

Eight miles north of Rt. 30 and Columbia on Route #441, the Bainbridge Sportsmen's Club is within comfortable driving range of Baltimore, Philadelphia, Harrisburg, Lancaster and York.

For more information, contact Bainbridge Sportsmen's Club, Inc., R.D. #1, Box 23-1, Bainbridge, PA 17052 or call (717) 426-2114.



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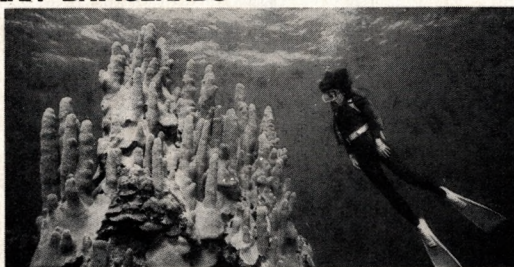
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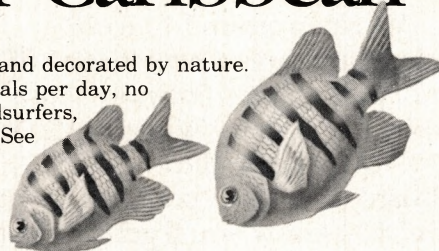
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WATSON'S/CHUB CAY

Neal Watson's Undersea Adventures has recently acquired the dive operation at the exclusive Chub Cay Club in the Berry Islands, Bahamas. Chub Cay is a well known diving and fishing destination at the northern end of the Tongue of the Ocean. The club offers an excellent menu; comfortable, well-appointed accommodations; and a self-contained atmosphere on a small island. There are excellent shallow coral gardens and miles of nearby drop-offs where reef and deep-water species abound.

For information contact Neal Watson's Undersea Adventures, P.O. Box 21766, Ft. Lauderdale, FL 33335; (800) 327-8150 or (305) 763-2188. 🐠

SHANK TO AKR

Frank Shank, an experienced diver and frequent visitor to the island of Roatan, has been appointed sales represent-



ative for Anthony's Key Resort. His territory will include dive stores in the U.S. and Canada. 🐠

REILLY'S TREASURED GOLD

Reilly's Treasured Gold, specializing in dive gear and treasure hunting equipment, has opened in Pompano Beach, Florida. PADI basic, open water and advanced certifications as well as specialty courses are offered.

For more information contact Reilly's Treasured Gold, 2003 West McNab Road, #10, Pompano Beach, FL 33069; (305) 971-6102. 🐠

NATIVE DIVER

Miami has a new custom dive boat, *Native Diver*. It is docked at the Miami Beach Marina on the 300 block of Alton Road, at the mouth of Government Cut. Specializing in wreck diving, Captains Darrell Nichols and Dave Gleim offer half and full day charters to such wrecks as the *Orion*, *Deep Freeze*, *Arida* and others. Reef, drift, lobster and night dives are also available.

For more information contact *Native Diver* at (305) 754-7123. 🐠

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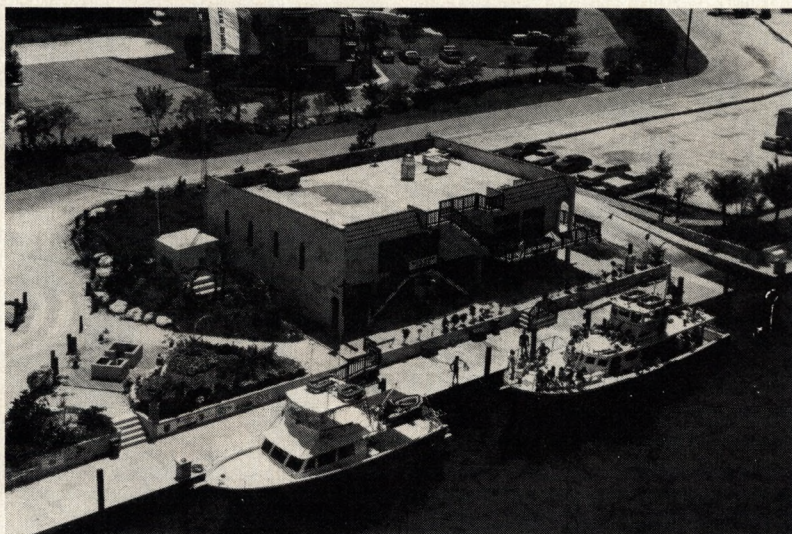
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Marina Bay has 125 "floating" rooms in a houseboat hotel, three conference rooms, 13 tennis courts, 60 marina slips, two lounges with live entertainment, a private club and restaurant. Scubarific has rental gear, offers dive packages, including accommodations, and has a new 40 foot dive boat.

For more information contact Scubarific, 2698 SW 23rd Avenue, Marina Bay Drive, Fort Lauderdale, FL 33312; (305) 587-9012.

HELIX/BONAIRE

Exotic Bonaire, in the Dutch Caribbean near Venezuela, is the site of the first Helix Photo/Dive trip for 1986. This trip includes two boat dives each day in six days of diving, with additional beach and pier dives. Experienced divers will be on hand, with instruction available to novices. Accommodations will be at the Flamingo Beach Hotel.

Tanks, air and weightbelts are included. Some close-up and macro photo equipment will be available with no added charge. Nikonos cameras and flash attachments may be rented.

For more information about the Helix 1986 Dive trip to Bonaire, contact Helix, 325 West Huron, Chicago, IL 60610.

LITTLE CAYMAN SEMINAR

Nancy Sefton will host the annual photo seminar on Little Cayman, May 4-11. Entitled Reef Life Appreciation and Photography, the workshop will take place at the Southern Cross Club.

Sefton is author of the book *Dive Cayman* and co-author of the new *Caribbean Reef Invertebrates*. Her articles and photos have appeared in Time-Life Books, Reader's Digest Assn. books, and *Attenborough's Life on Earth*, as well as *SKIN DIVER* and *Ocean Realm* magazines.

Her seminar is designed to give divers new insights into coral reef ecology and show them how to approach reef creatures with a camera. The seven night seminar package includes room, meals, daily two tank dives at Bloody Bay and slide/discussion workshops each evening. E-6 processing is available.

For further information, contact Merchant's Travel, 11 South Meridian St., 200 Merchant's Bank Building, Indianapolis, IN 46204; (317) 267-7970.



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Fifteen years ago, I started taking divers to the best diving in Belize. Then, I had only a three room hotel and no restaurant. Now, I've got a 15 room hotel, plus an aquarium and an oceanfront bar that's the most unique in the Caribbean. Just about everyone that's ever dove with me has come back to visit us again.

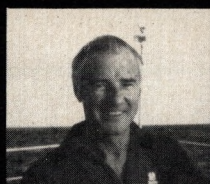
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 or call in Amergris Caye, Belize, Central America, 011-501-026-2013.

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CARL ROESSLER REPORTS FOR SEE & SEA TRAVEL

President, See & Sea Travel Service, Inc.
Author, *The Underwater Wilderness*
Mastering Underwater Photography
The Undersea Predators
Diver's Guide to the Cayman Islands

THE REEFS OF BELIZE ABOARD *ISLA MIA*

Dateline Belize: The best-kept secret in the Caribbean is the diver's time-warp in Belize. Here, time has been standing still for twenty years, with wonderful benefits for the travelling diver.

Flying into Belize City we find no skyscrapers, no signs of the hectic pace of the modern world. From the crowded harbor throngs of small fishing boats run daily to the turbid waters of Belize's great barrier reef, sweeping its former riches to market. Belize's few dive resorts bring their divers to the same barrier reef for daily dive trips, with predictably modest results.

Ah, but--the fortunate divers who manage to cruise 60 miles out to sea off Belize really find themselves in a time and place out of the glorious past. At Lighthouse Reef we are beyond the reach of fishermen, and there are no hotels. Here blue ocean waters lave the towering coral edifices which rise nearly to the sun-splashed surface.

The vast dropoffs throng with big groupers and snappers, hog-fish, rays and turtles: this is diving as it was in the Caribbean's

glory days, before most reefs were swept by fishermen. We've had days when four manta rays spent the entire morning soaring about us. Sheer magic; experiences of an unspoiled paradise.

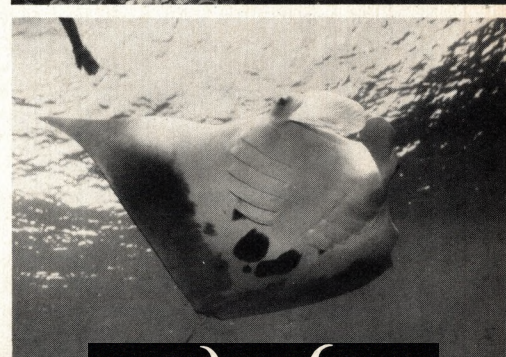
To reach these pristine enclaves, See & Sea Travel offers divers and groups a floating dive resort - the 75 foot *Isla Mia*. This live-aboard dive vessel is perfectly suited to a week of undersea wonders. She has five double cabins and a cabin for six - all air-conditioned - plus a lounging library that is comfort incarnate. Add a comfortable dining area with built-in settees, and your between-dive lounging is sybaritic and totally tempting.

Of course, aboard *Isla Mia*, you just don't spend that much between-dive time. The reefs and animals are so fascinating you'll be wanting to go back into the water as soon as you've reloaded your cameras.

The special advantages of live-aboard diving are never so clear as in Belize. There is simply no other way to spend the entire week on the Lighthouse Reef dropoffs other than to live on a comfortable, reliable dive boat.

Reliability is a big issue in live-aboard diving. See & Sea Travel is the "Good Housekeeping Seal" of this industry. See & Sea refuses to represent any vessel that does not meet the highest standard of maintenance and comfort. *Isla Mia* meets See & Sea's exacting standards, assuring you of the finest dive vacation in Belize.

Is this your year for Belize's time warp? For information on the best dive vacation in Belize, call See & Sea today.



See & Sea Travel, Inc. exclusively represents the world's finest fleet of dive cruisers as well as booking the world's leading shore-based dive resorts. See & Sea will not represent any vessel that won't deliver excellent food, personal comfort and service and unlimited diving. Join us in Belize, the Bahamas, the Caymans, Turks & Caicos, Guadeloupe, Red Sea, Truk Lagoon, Palau, Hawaii, Fiji, Philippines, Papua New Guinea, Galapagos, Australia's Coral Sea and our Great White Shark expedition. Insist on the finest; insist on See & Sea diving adventures.

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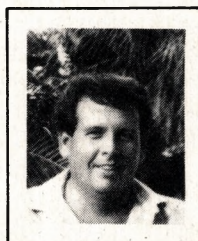
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WATERMAN/CURACAO

Stan Waterman, assisted by his son
 Gordy, recently completed a film featur-
 ing the underwater and topside attrac-
 tions of the island of Curacao. Segments



photo/Adam Ravetch

emphasized the many attractions of the
 Curacao Underwater Park, nearby island
 of Klein Curacao, the public aquarium,
 windsurfing and more. The film will be
 shown soon at film festivals and sympo-
 siums throughout the U.S.

DON FOSTER'S DIVE BOATS

Don Foster's Dive Grand Cayman Ltd.
 recently took delivery of two new, custom
 52 foot flattop dive boats. The custom
 boats have a 14 foot beam and the hull
 is Don's design, registered exclusively
 under his name. Powered by twin 165 hp
 Volvo diesel engines, the boats are both
 speedy and fuel-efficient, capable of trav-
 eling at 20-24 knots with a full load of 30
 divers. Each boat features ladders rather
 than ramps for easy exit from the water
 and swim platforms on the stern, for con-
 venient entries.

The new custom boats bring the Fos-
 ter's fleet total to six, including two 26
 foot flattops, *Adventure Diver* and *Reef-
 seeker*; 36 foot flattop *Undersea Diver*
 and 34 foot custom V-hull *Wavemaker*.
 The additional boats have increased Fos-
 ter's capacity to 130 divers per trip, with
 no crowding.

For information on dive vacations
 through Don Foster's Dive Grand Cay-
 man Ltd. at the Royal Palms Hotel or in
 luxury beachfront Hospitality World villas,
 contact Scuba Tours Inc. (800) 526-
 1394; in New Jersey, (201) 256-9115; on
 grand Cayman, (809) 949-7025; or write
 P.O. Box 151, Grand Cayman, BWI.

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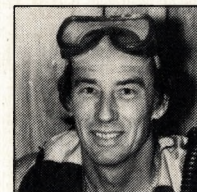
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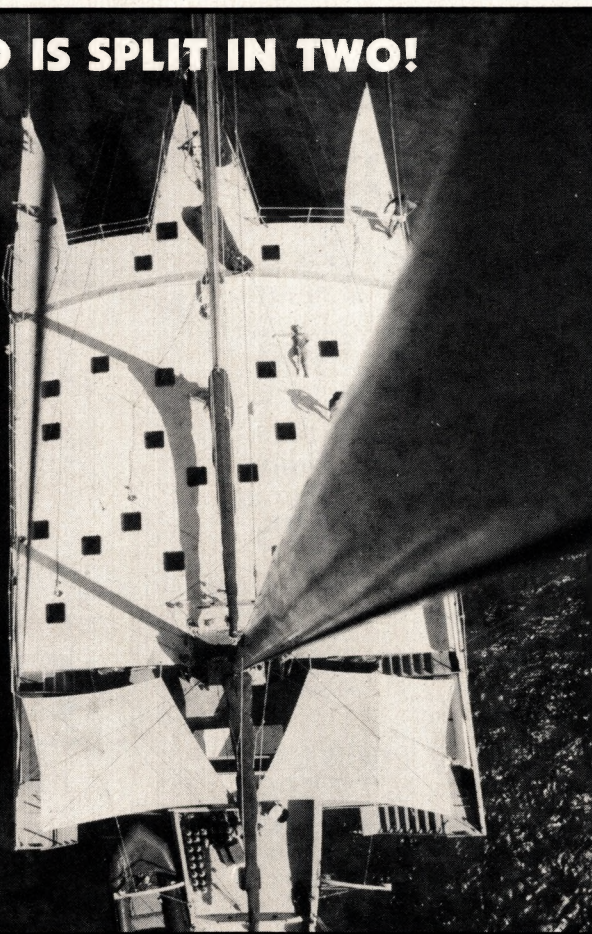
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CLARK/SEA AGGRESSOR

Dr. Eugenie Clark and See & Sea Travel's Naomi Stern will host a Bahamas adventure February 16-22, 1986. Cruising out of Nassau aboard the 90 foot Sea Aggressor, Dr. Clark's group will pursue un-



derwater research on razor fish; they will also dive Bahamas walls and coral gardens. Aboard the air-conditioned Sea Aggressor, divers will be treated to slide shows and seminars.

Enrollments are limited to 15. To join this adventure contact: Naomi Stern, 100 W. 81st Street, New York, NY 10024 (212) 873-4059 or See & Sea Travel, Inc., 680 Beach Street, Suite 340, San Francisco, California 94109; (415) 771-0077. 🐟

REGENCY/ST. THOMAS

Regency International Yacht Charters has completed the expansion of its offices in St. Thomas and named Kathy Wagner general manager. For the 1986 season the brokerage staff has been increased to five crewed yacht brokers and three bareboat brokers. The crewed yacht division, in addition to Kathy, includes: Bettie Biggs, Carolyn Austin, Launa Cable and Lorie Trent. The bareboat division is managed by Leila Roberts with brokers Becky Longhauser and Chris Leffers.

The company is affiliated with Admiralty Travel in St. Thomas, to assist its charter clients with the most cost effective airline reservations to the Caribbean.

Regency also has a new corporate address in Houston: 5151 San Felipe, Suite 950, Houston, Texas 77056. Houston telephone and telex numbers will remain the same. All requests for reservations and information will continue to be handled via the toll free number (800) 524-7676 in St. Thomas. 🐟

CUSTOM DIVING SAFARIS

Custom Diving Safaris has arranged for two additional guided tours this year. Group size is limited to 20 experienced divers and all trips are led by certified divemasters who have taken groups to these locations on many previous occasions. Upcoming trips include Roatan, Honduras November 23-30; and Cozumel, Mexico December 21-28.

For additional details and brochures write to: Custom Diving Safaris, Inc., P.O. Box 291437, Fort Lauderdale, FL 33329. 🐟



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INTRODUCING... SURFSIDE'S NEW DIVE OPERATION located on the island of SAINT EUSTATIUS, NETHERLANDS ANTILLES at the lovely "OLD GIN HOUSE" hotel. INTERESTED IN DIVING SOMEPLACE SPECIAL? SOMEPLACE WHERE THE MARITIME HISTORY IS SO THICK YOU CAN TOUCH IT! Imagine diving in a place where very few people have ever been diving before, and also consider this...



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- In its 18th century heyday over 3000 ships a year made Statia's one Bay their port of call.
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- Ships of every design and flying flags of all colors anchored in Statias Bay.
- Virtually all commerce of any importance, honest or illicit, was diverted through Statia.
- Practically all traffic between Europe and the American colonies was conducted through Statia.
- Noted historians believe that between battles, storms and collisions, there are more than 200 ships sunk in Statias untouched bay.

- April 6, 1690, an earthquake casts more than half the town into the sea—warehouses full of plunder and contraband.
- Access to dive historical ST. KITTS (6 miles), SABA (13 miles), ST. MAARTEN (34 miles).
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WE ARE NOT SURE WHAT YOU WILL FIND ON THE BOTTOM WHILE DIVING WITH SURFSIDE AT STATIA. YOU WILL FIND SURFSIDE-STATIA TO BE A PROFESSIONAL, ACCOMMODATING, WELL EQUIPPED, WELL RUN DIVE OPERATION; YOU WILL FIND EXCELLENT FOOD AND ACCOMMODATIONS AND YOU WILL FIND A BEAUTIFUL ISLAND WITH FRIENDLY PEOPLE. CALL OR WRITE OUR U.S.A. SALES OFFICE FOR MORE INFORMATION AND RESERVATIONS.

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Our newly opened dive operation at Rum Point on Cayman's beautiful North Side allows us to offer packages with a number of fine resort hotels and condominiums. Individual/group packages at the beautiful *Retreat at Rum Point* and at *Villa Caribe Resort*, complete with excellent native and American cuisine, are now available at reasonable rates.

SURFSIDE WATERSPORTS ON SEVEN MILE BEACH

with locations at Beach Club Colony Resort and at Le Club Cayman Resort Hotel, continues to offer dive packages with a variety of excellent hotels and condominiums on Seven Mile Beach. These locations serve as our complete watersports headquarters. For fun and enjoyment that doesn't exclude anyone, we offer parasailing, jetskiing, paddleboating, windsurfing, sailing, glassbottom boat trips, snorkel trips and much more.

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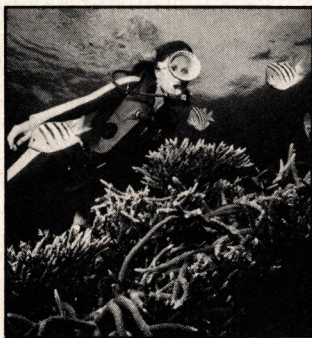
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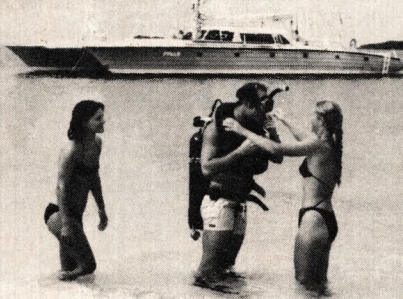
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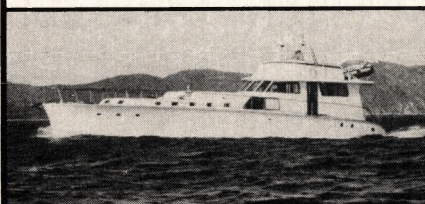
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AGGRESSORS

See & Sea Travel of San Francisco is offering cruises aboard a brand-new sister ship to the *Cayman Aggressor*. The new cruiser will be 100 feet long, with all of the amenities of the *Cayman Aggressor* such as air-conditioning, 600 gallon



per day watermaker, hot showers, on-board film processing and even more comfort and privacy.

The first sister ship to the *Cayman Aggressor* was the *Sea Aggressor*, now operating in the Bahamas. The new Cayman ship will bring the *Aggressor* fleet to three, with more planned.

For further information on this new generation of comfortable cruisers contact See & Sea Travel, Inc., 680 Beach Street, Suite 340, San Francisco, CA 94109; (415) 771-0077 or call (800) DIV-XPRT.

AQUA SAFARI/COZUMEL

Aqua Safari was registered as one of the first diving operations in Mexico on August 15, 1966 by Ramon Zapata, Juan Marrufo and Dick Tompkins, all of whom are still very much involved in the day to day activities of this business venture. In 1978, Bill Horn joined the organization.

Presently, Aqua Safari is in the process of building a new facility next to the Vista del Mar, about 50 yards south of its current Cozumel location. It will be capable of handling complete certification courses and provide classroom facilities and audio/visual aids. Besides the original boat, the *Christopher K*, there are two more fast boats, the *Ocean I* and *Ocean II*. They have been specially designed for diving and are equipped with first aid and safety gear including oxygen and VHF communications.

In order to make it easier for divers in the U.S. to make reservations, Aqua Safari has toll free numbers: Houston (713) 482-1954; Texas wats (800) 222-1537 plus 994194; U.S. wats (800) 225-0227 plus 994194.

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BY THOMAS P. O'CONNOR

The U-boat's torpedo struck the side of the freighter *Empire Knight* with a sickening thud. While the crew of the freighter was scrambling around trying to determine the amount of damage and make temporary repairs to keep the ship afloat, the U-boat was making her escape, silently, while still submerged. It was early in 1944 and the war was in full swing. A short distance away, in Casco Bay, there was a destroyer base with more ships and men available than the U-boat wanted to tangle with. Strike silently, submerge, run silent, run deep and rejoin the other U-boats at a rendezvous point; the German orders said nothing about hanging around to wait for any U.S. Navy destroyer fleet.

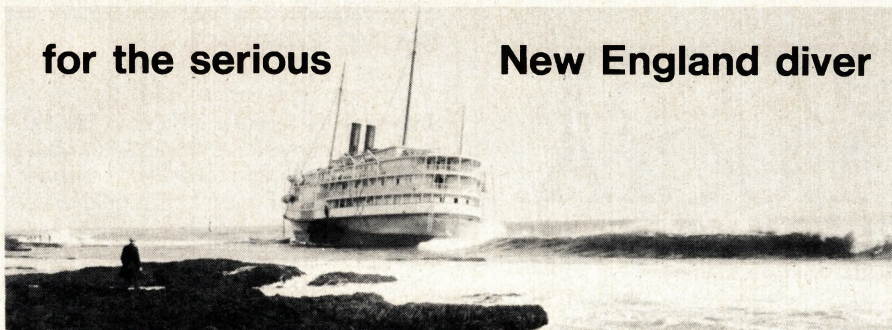
On the surface, meanwhile, unknown to the fleeing U-boat, the *Empire Knight* had not suffered any mortal damage. The crew kept the freighter afloat with pumps and temporary patches and they made it to a Canadian port for temporary repairs. Then the *Empire Knight* sailed for Boston for more extensive repair work. Her cargo of war materials was badly needed in Europe. She carried cases of M-1 rifles, Jeep and truck parts, a huge supply of Scotch whiskey and Canadian beer and a cargo of copper ingots needed by European factories.

The same conditions that made the need for war materials so urgent also made it necessary to keep the eastern shore as dark as possible—no sense leaving a light on for a U-boat. As the *Empire Knight* passed in a little too close to the coastline she ran up over Boone Island Ledge, eight miles off the York River. About 130 feet of the bow immediately ripped off and sank in 90 feet of water. The stern section continued on for five miles and sank in 240 feet of water. The absence of lights on shore had actually helped do the job the U-boats had failed to complete only a few days earlier.

Today, the bow of the *Empire Knight* is one of the most popular spots for sport divers in Maine. They start at the ledge and follow large piles of cargo across the seafloor from about 30 feet to 90 where the bow section rests. No valuable cargo has yet been found, just rotting cases of M-1 rifles, broken beer bottles, pickax heads and vehicle parts. But even though they may never find any valuable treasure

for the serious

New England diver



The Bay State ran up on the rocks at McKenny Point on Cape Elizabeth, Maine in 1916.

the divers will continue to make the eight mile trip offshore to the site for the thrill of diving into and around a shipwreck.

I've dreamed of visiting the wreck for years, ever since I first heard other divers tell me about the times they had diving the cold clear waters around the *Empire*. For me it would be like touring a World War II battleground underwater, completely unescorted, with a new adventure around every turn.

I can imagine myself swimming among the piles of cargo that divers tell me are as large as a house. Sixty feet of visibility would make it easy to follow the trail of cargo down the southwest side of the ledge right up to the hull of the bow section. Some divers say there is still a cannon mounted up forward.

After about two days of diving on this

British freighter I would weigh anchor and head for the Isles of Shoals, a short distance to the southwest, for a dive into early history. According to accounts in the Eastern Argus, a Portland newspaper of the early 1800s, there were at least two wrecks on the eastern side of Smutty Nose Island.

THE SCHOONER FRANCIS

The Argus for Tuesday, May 20, 1828 carried an ad for the steamboat *Legislator*, captained by Benjamin Harrod. The boat left Portland every Tuesday, Thursday and Saturday at 3:00 pm for Boston and returned every Monday, Wednesday and Friday at 3:00 pm. Passengers paid \$5—\$3 if you didn't mind sleeping in a forward cabin where the boat pitched a little more. A little further in the paper was

the following account:

"Wreck. The schooner *Francis*, of and from Bangor, for Boston, was cast away on NE end of Smutty Nose (Isles of Shoals) between 12 and 10 o'clock Thursday morning, and immediately went to pieces. The three passengers and four seamen, who were providentially saved and hospitably treated by the islanders, arrived in this town on Friday"—Portsmouth Journal of the 17th.

Those late spring storms that catch captains by surprise can be an awfully discouraging thing for passengers and boat owners alike. But at least when the water is a little warmer people have some chance of swimming to shore. In the middle of winter things are more apt to turn out the way they did 15 years earlier, according to an account in the Eastern Argus on January 21, 1813:

"Portsmouth, N.H. January 19. Shipwreck—on Thursday morning last the shattered fragments of a ship, supposed 300 to 400 tons, came on shore at the Isles of Shoals—In the course of the day nearly the whole body of the ship, masts, sails and rigging, cables and anchors and seven dead bodies came on shore—It appears from letters and papers which have been found on the beach that she was a Spanish ship from Cadiz bound to Philadelphia, supposed to have been laden with salt. Quantities of figs, almonds and raisins have been washed ashore.



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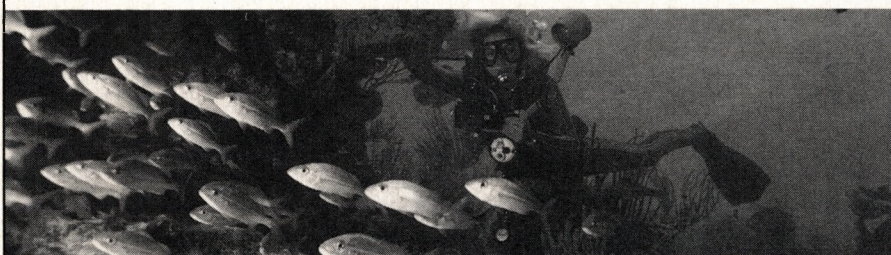


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MAINE WRECKS

She appears to have struck on the east point of Smutty Nose Island and to have gone to pieces immediately—We understood one of the men had a gold watch in his pocket and several dollars have been found on the beach. One letter which we have seen is dated Cadiz, October 26, directed to Mr. George Thomson, Philadelphia."

Whenever I have read about this Spanish shipwreck in any article other than the original newspaper account I have always seen it called a Spanish treasure ship—writers like to exaggerate things like this. But I doubt it was anything resembling a treasure ship—a load of salt is hardly what I would consider a treasure. But there is always a chance of finding a few early gold coins in these old wrecks.

But even without finding a little treasure, diving around the Isles of Shoals can be fun. New England divers like to brag about them because of the beautiful diving conditions there; 60 feet of visibility or more in clean waters, teeming with a variety of marine life. In summer the water warms up to the point where a diver wearing a wetsuit can be comfortable for three hours or more. Divers have bragged to me that they found excellent wreck diving here. For a serious New England wreck diver a trip to the Isles of Shoals is a must. In my winter dreams of a wreck diving odyssey I picture myself going there and finding both the schooner *Francis* and the unnamed Spanish wreck, one lying on top of the other just the way the two shipwrecks that inspired the movie *The Deep* are lying together off Elbow Beach in Bermuda.

I also like to picture myself finding some long lost artifact that would be the clue needed to identify the ship so she could be something more than just the Spanish wreck. Many a sport diver has added to the volumes of local marine history in just such a way.

THE BAY STATE

Cape Elizabeth can get warm in the summertime. While the sun is still high in the sky we pull into the lee of Richmond's Island for our next visit with long lost maritime history of Maine, the *Bay State*. She was a big sidewheeler belonging to the Eastern Steamship Corporation. The ship was carrying 185 passengers when she ran up on the rocks at McKenny Point, Cape Elizabeth at 3:25 am on Saturday morning, September 23, 1916. All the passengers were rescued by local fishermen, tugs and a revenue cutter.

The Portland Evening Express & Advertiser on September 23, 1916 had the following interview with a man named Martin McQueen of Lawrence who was

below decks at the time of the wreck:

"I waked up when I heard that gong banging away and everybody was getting up and yelling 'What's the matter?' That is about as far as anybody stopped to talk. It was up and out for everybody, just as they got out of their bunks. I wasn't the last man out, not by a jug full. One guy had his shirt in his hand and he was some crazy, but he went back and rigged up after he had been out in the cold a few minutes. We all got excited, naturally enough, for it is no great fun to get wrecked and be down where the water gets in first. I think the crew did a good job. They obeyed orders, there was no great fussing among the women, we all gave them a lift if they needed it and they got a square deal. I took my chances of getting ashore and a fisherman with a dory landed a boatful of us on the beach. A bunch of us were going to Canada. I suppose I'll find them in Portland today."

A few days later the Portland papers carried an interview with Captain Foran, captain of the *Bay State*. His story was:

"I left Boston on the usual sailing time Friday night, the 22nd with favorable light, southeast winds and clear weather. When I got to Baker's Island off Salem a dense fog shut in, this was about 8:30 as nearly as I can remember without my log.

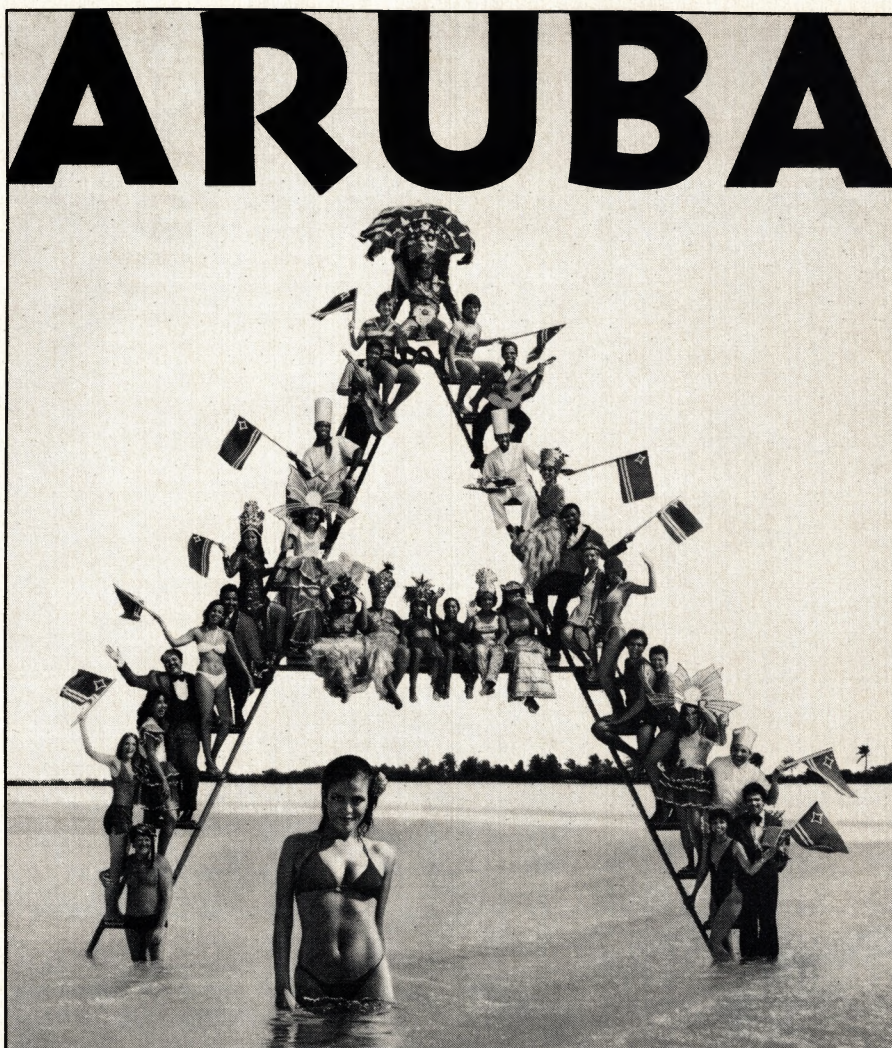
"I went into the pilot house at that time and remained there all through the night, and was there when the vessel struck. I had two pilots with me, first pilot Jones and second pilot L. Gilpatrick, both first class men in every way. I got down to Thatcher's Island and from the Cape Ann whistling buoy took my usual course for the lightship.

"I threw my log regularly and gave my usual course for the lightship as I have stated. I ran my time up for the Cape Elizabeth buoy, that I knew had taken the place of the lightship. When sailing time was up, I stopped my ship dead and listened for the whistle of the buoy. For a time no sound came at all out of the blackness, then after a minute or so the sound of a whistling buoy came from just abeam close on my port side.

"I was then by ordinary reckoning at the lightship's buoy and put the wheel to starboard and held my ship in close to the buoy, while I threw my searchlight and tried to distinguish it. It was impossible to see it, so thick was the fog. I judged myself, however, about a half a length from the buoy, on a NNW course as usual.

"I had full confidence after I heard the whistle. I kept her off NNW. I could hear no sound of Cape Elizabeth whatever, not a sound of anything in fact. Just before I made this buoy the steamer *Camden* passed close to me on my starboard side, going west. This, as every other indication, showed I was in the right course for the lightship.

"I remained with this buoy, as I have said, for perhaps a minute and then start-



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MAINE WRECKS

ed the ship, heading her NNW at 3:11. I struck the rocks at 3:25 after being 14 minutes on this course. At 3:24 our lookout sang out 'Breakers dead ahead.' I reversed the engines, full speed ahead, but it was too late. She had struck.

"A minute after she struck I got the wireless working and sent out a call for assistance at once. I also kept my warning signal going, as a further danger call. It seemed to me the matter of a few minutes before the lifesavers came alongside, although of course it was longer.

"In the meantime every man in the crew was mustered to his place and I never saw less real excitement or better discipline on the part of the men. There was no confusion, the boats that were lowered were lowered as they should be, though the arrival of the lifesavers made their use unnecessary. People could see as soon as they got about that we were near land and there was no panic.

"I want to say this to you reporter," said Captain Foran at the end of his story, and there was the voice of a broken man speaking, "I want to tell you and the public this: If I could have heard Cape Elizabeth, which we did not hear from the time our course lay north by east, to the time this vessel fetched up west-sou'west, round all that range of the compass, this thing would never have happened. Had the lightship been there, we would have heard her whistle and we could have heard any other properly constructed and placed whistle that they might choose to put in her place, but we could not and did not on that night hear sound of the whistle that the government put there to take the place of the lightship.

"I have had 17 years of this running up and down this coast and for 12 years I have stood and watched the courses over this ground. I considered that in that time I had mastered the key to the sailing of it. And, all in one light this—due to no fault of shipboard."

The fog was so thick that night in 1916 that Captain Foran mistook the buoy at Old Anthony for a temporary buoy that was replacing the lightship. Instead of turning north northwest up the channel to Portland Harbor, he turned north northwest onto the rocks at Cape Elizabeth, McKenny Point to be exact.

Several years ago Fred McDonald, president of Portland Diving Service, told me he found parts of the wreck of the *Bay State* in 30 feet of water off McKenny Point. Apparently she was bronze fastened. I suspect that somewhere in the wreckage a diver could find a gold ceremonial launching spike

THE GOVERNOR DINGLEY

It was in the main channel into Portland Harbor that the Portland Steamship Com-

pany's steamer *Governor Dingley* collided with and sank, first a two masted schooner in 1900 and then a three masted schooner in 1905.

It was early in the evening, about 7:15, on Friday, November 23, 1900, when the two masted schooner *Minette* tried to make port. As she was on a starboard tack near the breakwater, Captain Pinkham, of South Harpswell, could see the *Governor Dingley* several hundred yards away. Owing to wind and tide the schooner could not change her course, so Captain Pinkham yelled to the steamer and received a reply. The engine was reversed on the *Dingley*. Some people thought that if the *Dingley* had been a sidewheeler like her predecessor the *Bay State*, she would have been able to stop in time. However, she was not so she slid up against the side of the schooner and pushed the vessel under the water.

The crew of the *Minette* was rescued by the steamer but they lost all their possessions and 12,000 pounds of fish. All sails were set at the time of sinking and the wreck made a strange appearance with her masts half out of the water about 200 yards off the breakwater. It is thought that neither the steamer nor the *Minette* received any damage during the accident. There were hopes of raising the *Minette* but it was a bad time of year for such operations and the newspapers give no indications that any salvage work took place.

There is no question about the other schooner the *Dingley* sank in the channel: It still sits there in about 55 feet of water. It all started on a foggy morning, July 8, 1905, as the *Governor Dingley* was returning from Boston. Fog had been light up to the lightship. After that it had been rough going and so the steamer reduced speed to four knots. Fog signals were sounded and could be heard from other vessels. But nothing could be seen in this spooky white fog until the bow of the three masted schooner *Sarah C. Smith* suddenly materialized out of the fog half a length ahead. The *Dingley's* engines were thrown into reverse but there was no time to slow the big steamer down. The bow of the *Dingley* cut so far into the port side of the schooner that she sank in less than two minutes.

The *Sarah C. Smith* was loaded with paving stones and she sank very quickly. The crew saved nothing but what they had on their backs.

On board the *Dingley* the collision was only noticeable to a few men in the bow area who thought the side of the ship was caving in. Later there was only slight damage noticeable on the *Dingley*, some scratched paint and a little damage to the port rail. Most of the *Dingley's* passengers didn't even bother to get out of bed.

A short time later the *Sarah C. Smith* was declared a hazard to navigation and was blasted down enough to reduce the hazard to shipping. 

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Seasoned Panhandle divers question the visibility of Gulf Shores since it's between Pensacola Bay, 25 miles to the east, and Mobile Bay, 25 miles to the west. But Fred Givens, owner of Pleasure Island Dive Center, explains that "once



Gulf Shores, Alabama offers a small, quiet retreat for vacationers. Except for diving, its only claim to fame was the disaster it suffered during a hurricane in 1979.

you're past the tide line visibility is the same as other Florida Panhandle sites." Givens should know. He's dived off Gulf Shores for the past 26 years.

Rick Burns is a diver and captain of the only exclusive dive boat in Gulf Shores. He calls the area "the sleeper of the Gulf Coast." Spearfishermen listen attentively when he speaks from experience. "We have more and bigger fish with about 28 good spots. Our sites are not fished out."

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A diver prepares to enter the water from the *Gulf Diver*. Gulf Shores diving includes the *Wallace* wreck and Double Dutch Reef.

eral natural reefs. Depths range from 40 to 120 feet.

A well hidden nook, Gulf Shores offers a small, quiet retreat for vacationers. With less than 3,000 year-round residents, its claim to fame came on September 12, 1979. On this day, Hurricane Frederic smashed into the small island community. A Birmingham newspaper reported

the next morning that "most of Gulf Shores is gone." It was accurate reporting; Frederic had completely redesigned the coastline east of Mobile Bay to the Florida line. Today, fading bumper stickers proclaim: "Gulf Shores is back."

The two most popular sites in Gulf Shores diving are the *Wallace* Liberty Ship and the recently discovered Double Dutch Reef. A two tank, half day trip to these locations gives diverse opportunities to view local conditions.

The *Wallace* is more intact than other Liberty Ships sunk in the Gulf. Tons of metal were taken from scrapped Liberty Ships at a Panama City, Florida shipyard in the late 1960s. After being stripped, the hulls were towed out and sunk.

An impressive structure, the *Wallace* was split in two by Frederic, making the site look more like two wrecks. Approaching 400 feet in length, the bow runs north and south, the stern more east and west. The break is clearly visible and the two pieces lie about 35 feet from each other. To cover the entire ship takes more than a single dive at 80-90 feet.

Schools of amberjack swim around and large spadefish circle below in the hull. Large sand dollars and lazy looking sea cucumbers dot the sand bottom around the ship. Attached to the hull and gathered on and under steel ledges, shells are plentiful and colorful. Collectors display *Murex*, spiny oysters,

cowries and large olives taken from Gulf Shores waters.

The captain's Loran log has a list of numbers on Double Dutch Reef, indicating a long reef system. It has beautiful coral ledges with seafans and other marine life growing around it. The abundance of marine life blends and contrasts with vivid colors. Squirrelfish, queen and blue angels hover over it and amberjack, snapper and triggerfish venture nearby.

Marine life is also attracted to the bridge rubble and barges where underwater hunters look for big amberjack, grouper, snapper and flounder. Flounder measuring 18-20 inches are often taken. Grouper of more than 20 pounds are common catches for a spearfisherman.

Several 20 foot deep beach dives are also available in Gulf Shores including the jetties at Alabama Point. Whiskey Wreck, reportedly an old rum runner, is the most frequented. It lies about 150-200 yards offshore West Beach, not three miles from the center of town. Divers headed for Whiskey Wreck can be seen sidestepping the sunbathers to gain access to the well known site. It's a relaxing dive after a weekend of deeper dives.

Gulf Shores is a sleeping dive site. The fish may not know you on a first name basis, but with abundant diving opportunities it can be said that soon avid divers and the local fish will definitely become better acquainted. 

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TEXT AND PHOTOGRAPHY
BY BONNIE J. CARDONE

My first logbook was begun because of the 1975 LA County Ordinance. This disastrous piece of legislation, most of which was eventually overturned, required yearly recertification. This could be accomplished most easily by producing a logbook of your diving activities. Although it began as a chore, I soon realized how valuable a logbook could be.

Most importantly, it can be used to keep track of your depth and bottom time for each dive.

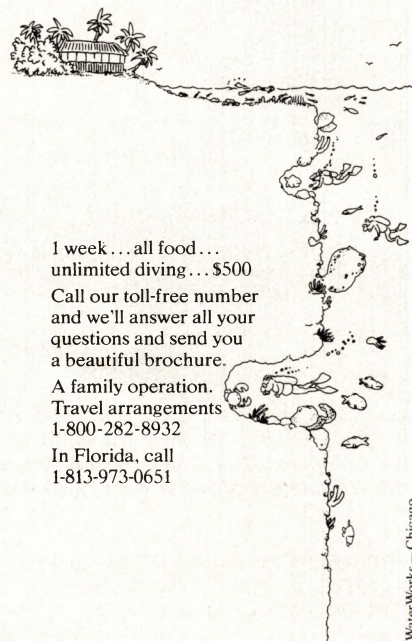
If you maintain a saltwater aquarium and collect creatures for it on your dives, you can note what you collected, as well as when and where, in your logbook. This provides a record of the animal's longevity and lets you know where to look for what on future dives. If you are a shell collector, noting where you find each particular shell can also be a logbook entry. This type of information makes a shell more valuable. Game collectors should keep logbook notations on the best lobster, spearfishing, abalone, etc., areas. That way you don't waste time looking for game that isn't there and are prepared for the game that is.

A logbook is incredibly valuable for photographers. I record the most memorable creature or scene I photographed on each dive and what equipment I used. When I get my slides back I can identify each dive site quickly. If you're writing an article, planning a slide show or just classifying your photographs, this is significant information. Should you return to the same site on a later date, you will know what equipment to take down with you. We've all taken wide angle lenses down on an area that offered only great macro. If you've noted this in your logbook, you won't make the same mistake twice. If you want to rephotograph something that didn't come out the first time, a notation in your logbook can help you duplicate your equipment and efforts, hopefully with better results.

Of course, recording dives in logbooks also provides memories of a trip and is an end in itself. For the practical minded, logbooks are required by some organizations as proof of your skill level, experience and most recent dive. In the Florida Keys, many dive operators ask you to

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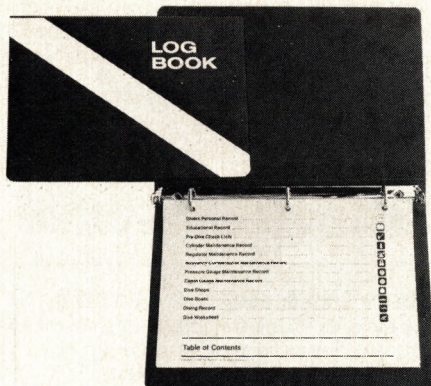
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produce one before they'll let you dive off their boats. Some resorts use logbooks to determine what dive sites to take you to. That way, advanced divers don't end up on reefs suitable only for novices.

Logbooks come in all shapes and sizes and I now have seven of them. What I have learned is that some are much better than others.

I was impressed with the logbook that illustrates this article. It is a compact (10 by 6 3/4 inches), three ring binder with a hard plastic cover that is water and oil



resistant. You can take it anywhere and not have to worry about it getting wet. If it gets soiled, wipe it off with a damp sponge or cloth. The paper, according to the manufacturer, is impervious to water, mold and mildew. Refill pages are available. For \$5.95 (plus \$2.50 shipping and

handling) you get 32 Diving Record pages and 32 dive profile worksheets.

The Paper 'n' Ink Logbook is meant to be a permanent, long-lasting record and it provides space in which to note everything pertinent about your diving including: Personal Record sheets for your name and address, medical information, courses taken. There are Pre-Dive Checklists; Cylinder, Regulator, BC, Pressure and Depth Gauge Maintenance Records; and special sheets on which to write the names, addresses and other information about dive stores and dive boats. At the back of the book there are several dive profile worksheets. You can record your dives on these permanently, in ink, or work in pencil and erase later.

The Diving Record sheets provide a full page for each dive. Although I usually only record bottom time, depth, visibility, location, camera equipment used and creatures photographed, there is room for all sorts of other information including: boat and captain names; compass heading; weather and sea conditions; purpose and type of dive; cylinder capacity (cubic feet); air pressure at beginning and end of dive; dive buddy and more.

The Paper 'n' Ink Logbook sells for \$15.95, plus \$2.50 shipping and handling. It is available from your dive store. For more information write: Paper 'n' Ink, 1442 Lincoln Avenue, Suite 350, Orange, CA 92665.



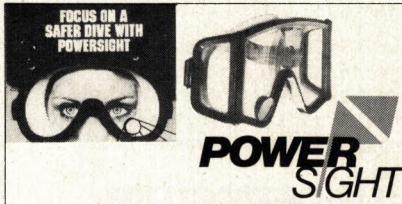
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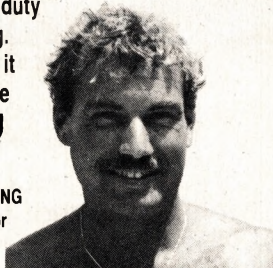
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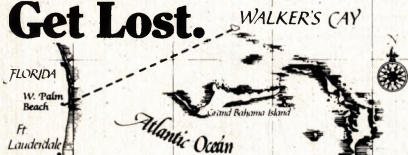
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BEAVERTAIL POINT

Lighthouse Marks
Rhode Island Dive Site

BY CHRISTOPHER WILLIS

Beavertail point is the southernmost tip of Conanicut Island (Jamestown, Rhode Island), centered in the mouth of Narragansett Bay. From it one can easily see Brenton Point in Newport to the east and Bonnett Shores in Narragansett to the west. The point begins the separation of the east and west passages of the bay. The rocky cliffs of Beavertail have always been an important landmark to ships entering Narragansett Bay. As early as 1749 a lighthouse was erected to warn ships off the rocks. This light station is the third oldest on the East Coast.

Today Beavertail is a state park enjoyed by picnickers, sightseers, sunbathers, fishermen and, of course, scuba divers. It is an area that cannot be fully explored or appreciated in one or two dives. There are several spots to enter and each offers a new diving experience.

But first, a word about conditions: Be careful. Beavertail often gets too rough to dive even when other spots on the island are OK. Take a good, close look at the water. Sometimes, depending on the wind and tide, the east side or the point itself might be too rough, but the west side is calmer. Don't be afraid to abort the dive and go someplace less hazardous like Fort Getty or Fort Wetherill.

When conditions are good the diving is great. Along the west shore the bottom drops off gradually to 40 feet. There are many rocks and boulders where lobsters like to hide. Every so often a flounder will dart out from a sandy patch of bottom. Closer to the point, in 20 feet of water or less, the afternoon sun glorifies the visibility and the colors shine. The sun's brightness on the rocks and flora gives the ocean floor a variegated beauty.

Entry to the west shore can be made from a parking lot north of the point or from a tiny beach just below (southwest of) the lighthouse. The direction of the tide and the wind should be taken into account when deciding where to enter and which way to head.

Diving directly off the point can be tricky because of the rock formations and surf. Be aware that the surf may increase while you are underwater. There is an entry/exit channel that cuts through the rocks at a heading of 250 degrees. This channel should be deep enough to get below the surge at high tide.

Directly outside the channel, less than 50 yards offshore in about 30 feet of water, is the wreck of the *Captain Lawrence*.



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Little more than wooden beams and steel plate remain of this fishing boat, which went down in August 1980. However, it is fun to explore and very interesting.

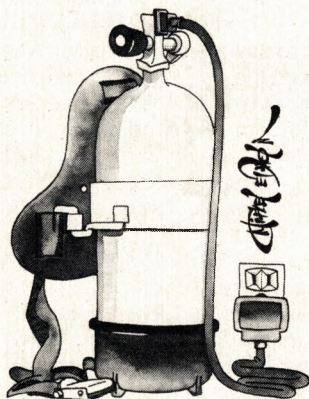
Heading south from the wreck one encounters canyons of boulders and extensive mussel beds. Good-sized tautogs are frequently seen munching on the mussels. A wide variety of smaller fish can be seen as well.

Leave yourself enough air for the swim in. Things seem different looking back to shore and it can be difficult relocating the channel you came out in, but it's worth the time and effort to avoid climbing over the rocks through the surf. Once you've located the channel, take a heading with your compass and exit underwater.

Diving off the east shore is the most exciting in the area. A favorite entry is just below the southern end of the first parking lot. Once down the cliff face there are a few flat rocks that lead to the water's edge. Tread carefully as they can be slippery. Striped bass have been seen in quite close, in as little as four feet of water. Fifty yards offshore the water is about 40 feet deep. Long canyons along the bottom are good to swim through, looking for fish and lobsters. As you head south the depth drops off considerably. Depths of 60 to 70 feet are easily reached without too long a swim. The variation between the well lit, weed covered rocks at 30 feet and the dimly lit gray rocks and sand at 70 feet is quite remarkable. Remember to watch your time as you get deep.

Jamestown is a quaint Rhode Island seaside community. It sits just off the beaten path (Route 138) that runs from metropolitan New York to Newport and Cape Cod. In the middle of town is a full service dive store: Ocean State Scuba (23A Narragansett Avenue). Bob Clarke and his staff are eager to help visiting divers make the most of their vacations.

While Beavertail isn't necessarily a good spot for your first open water dive, it is an excellent site once you've got a little experience. You can spend an entire summer vacation diving around the point. But, so much depends on the conditions that diving at Beavertail is done only when mother nature and sister ocean allow it.



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West Indies Cave
Divers Discover

New Crustaceans

BY FREDERICK R. SCHRAM

Cave diving is an exacting and specialized sport. Unlike ordinary divers, the cavern diver has to be prepared for those situations where easy exit cannot be counted on. However, no other area of diving is making such a unique and profound contribution to our knowledge about life on this planet. For it has only recently come to be known that caves, specifically marine caves in the West Indies, have a unique array of animals living in their dark recesses.

The most frequently encountered creatures in these habitats are crustaceans, usually shrimp and related forms. However, of late a new and unique class of crustaceans has been collected. They are known by the name of *Remipedia*, meaning "the oar-feet." They are typically an inch or more in length. The animal looks, at first glance, like a swimming centipede with beautiful, mesmerizing, coordinated beats of its oar-feet passing down the length of the body.

Unlike most shrimp, which have distinct regions in the body, an anterior thorax just behind the head and a posterior abdomen or tail, remipedes have a segmented body with no subregions at all. In addition, each segment carries an identically developed set of simple, two-branched limbs that resemble paddles. This kind of body plan is primitive and the closest relative is a 300 million year old fossil from the coal age of Texas. Indeed, the discovery of the remipedes has forced scientists to completely rethink how crustaceans are related to each other and to other arthropods. Such revolutionary discoveries occur once in a generation at best.

Discoveries of new species have followed at a breathtaking pace since the first was found in 1981 in Lucayan Cavern on Grand Bahama Island—now a national park. However, remipedes also have been discovered in Freetown Cave on Grand Bahama and Dan's Cave on



Remipedes are a newly discovered form of crustacean found in marine caves. Typically an inch or more long, these predatory animals have many oar-like feet and grasping mouthparts. They swim by beautifully coordinated beats of their legs.

Abaco. In addition, they have been collected in the Turks and Caicos Islands from Cottage Pond on Middle Caicos, and from Old Blue Hill Cave and Airport Cave on Providenciales. One of the most surprising remipede finds occurred in a

drowned lava tube called Jaimaos del Agua on Lanzarote in the Canary Islands, on the other side of the Atlantic from the Bahamian and Caicos species. Indeed, the Canary Islands remipede turns out to be closely related to the first species described from Lucayan Cavern.

These creatures frequently live considerable distances from the cave openings, though in Old Blue Hill Cave they were collected in great numbers not far from the mouth. Two or three distinctly different species occur together in a cave system. They also live in the brackish waters below the halocline, the distinct interface between the overlying fresh water and the salty water below. For some reason, the animals thrive in water that is virtually oxygen-free. When they are brought to the surface and observed in ordinary aquaria, they literally burn themselves out in the oxygen rich water. They are carnivores and feed on other shrimp that live in the caves, their mouthparts specialized to grasp and hold their prey.

The remipedes are under study right now by a research team at the San Diego Natural History Museum. At least a dozen specimens are needed to adequately identify and describe a species; however, the scattered occurrence of these crustaceans has placed specimens at a premium. The animals are not hard to collect;

a net or squeeze bottle will bag one of the slow swimming beasts, though care must be taken to anticipate their normal twists and turns. New species of remipedes have been found in almost every cave system divers have looked in to date. It merely requires patience and persistent searching to collect them.

What is now needed is for more cave divers to be made aware that these creatures exist. Known localities need to be recollected for more specimens and other caves need to be explored. Because the shrimp and other crustaceans found with the remipedes are found on islands throughout the Caribbean, the San Diego scientists believe remipedes are widely distributed as well. Cave divers can make a real contribution toward understanding these unusual creatures and the unique habitat they live in by keeping an eye out for these and other crustaceans. Specimens can be easily preserved in 70 percent alcohol or a weak solution of formalin. Date, place and circumstances of collection should be noted. Specimens can then be sent to Dr. Frederick R. Schram, San Diego Natural History Museum, P.O. Box 1390, San Diego, CA 92112. If specimens are packed in a box with lots of cushioning material around a vial or well-sealed plastic bag, they should arrive safely.

Discover the treasures of Treasure Cay

Photo: Sue Kleva

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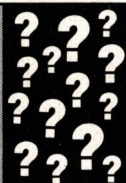
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Underwater Life Support Systems are potentially dangerous to a non-trained user. These include scuba tanks, regulators and buoyancy compensators. This ad does not constitute an offer to sell these items via mail order.

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What has a foot—but does not use it to move?
What has no arms—but hold on tenaciously?
What's used for fertilizer—but is good to eat?

Discover this common sea creature in the
December Skin Diver on sale November 26

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TECHNIFACTS

(Continued from Page 34)

ering a hose or pipe into a compartment inhaled a breath of gas from the open end of the pipe or hose being lowered.

A final warning about potential explosion problems in commercial diving. Never cut through a deck or bulkhead unless it is positively known what is on the opposite side of the structure. There may be explosive gases, hydrocarbon material such as oil, gasoline or explosives such as dynamite.

INSPECTION/NONDESTRUCTIVE TESTING COURSES

In several recent Technifacts I have stressed that one of the fastest growing employment possibilities for commercial divers is in the field of nondestructive testing and underwater inspections. All offshore structures are going through an aging process; some are more than 30 years old. For safety, and in many cases to meet government regulations, these structures must be periodically inspected and certain tests conducted to ascertain their safety for continued operations.

The College of Oceaneering, 277 South Fries Avenue, Wilmington, California 90744, now has several courses for divers interested in qualifying for the interesting and rewarding disciplines involved in nondestructive testing.

College of Oceaneering Course 250, Underwater Inspection and Nondestructive Testing, prepares a diver to deal with the typical surveys performed on offshore oil patch structures in all parts of the world. Successful completion of the course will qualify divers for the comprehensive Certificate Scheme for Weldment Inspection Personnel (CSWIP), Det norske Veritas (DnV) and Lloyds schemes of inspections. Course 256, Underwater Inspection for ROV Personnel and Data Controllers, provides qualified ROV (Remotely Operated Vehicles) pilots, observers and data controllers with the best possible background in the inspection and maintenance of offshore installations and pipelines.

Additional courses for special nondestructive testing include Course 257 and Course 258. Course 257 deals with electromagnetic testing featuring the E.M.D. Mk. III system for testing surface defects in metal, material variations resulting from product manufacture or stress, measuring crack depths and other inspection procedures. Course 258 qualifies divers in Level II ultrasonic weld inspection procedures.

Divers interested in the several disciplines of nondestructive testing as a method of enhancing their job qualifications, and potentially their job possibilities, can write to the College of Ocea-

The Best of HELIX[®]

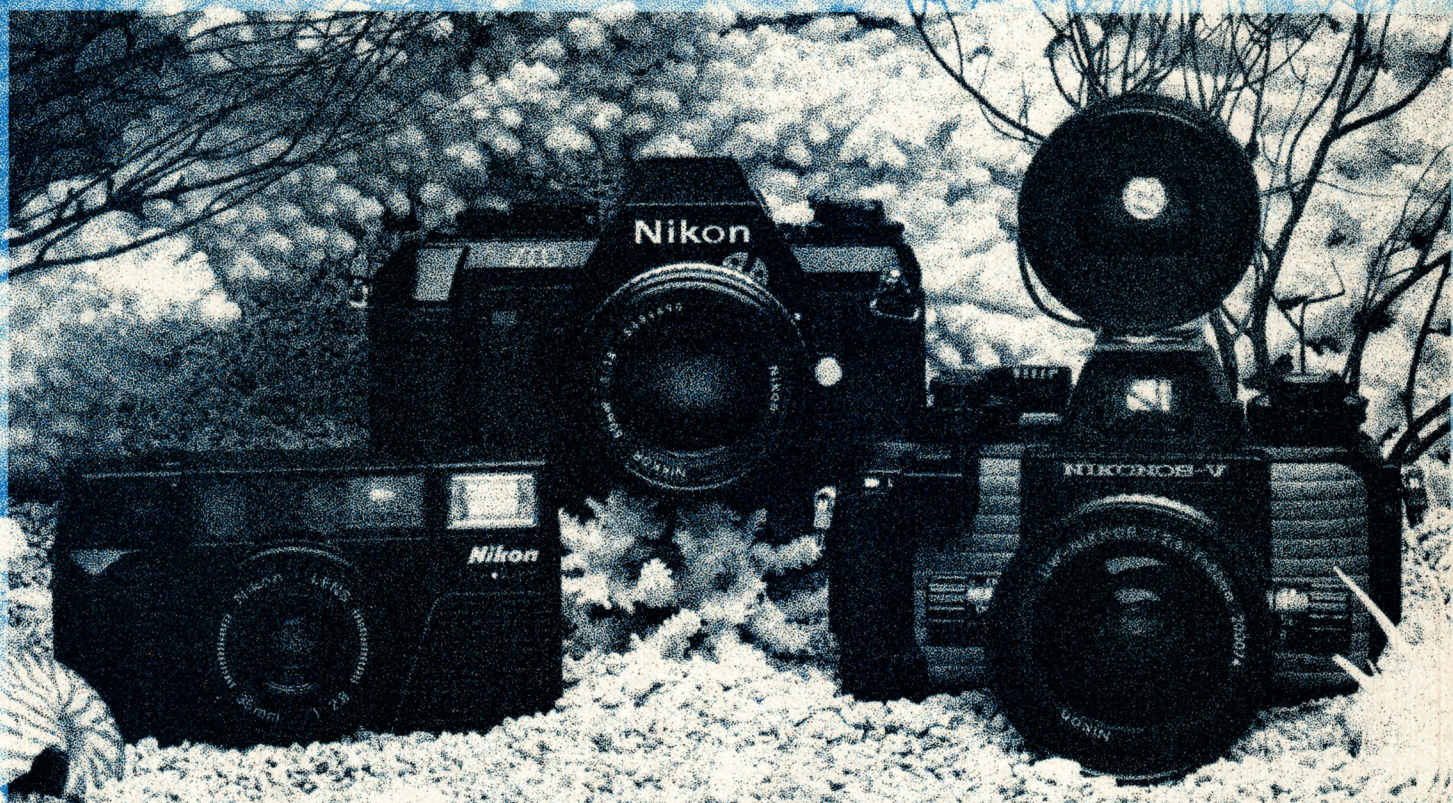
E Q U I P M E N T

UNDERWATER

D I V E T R I P S

PHOTOGRAPHY

P U B L I C A T I O N S



Helix is proud to present a sampling of the best underwater photography equipment available, including the Nikonos V shown here with the new 20mm f2.8 UW Nikkor lens and new 20/28mm optical viewfinder. The Nikonos V allows versatility never before attainable by the underwater photographer. It features aperture-priority auto-exposure, manual shutter speeds from 1/30 to 1/1000 second, flash sync speeds of 1/30, 1/60, 1/90 second, built-in light-meter and LED exposure indicators. The built-in TTL sensor accurately controls the output of any Nikonos V dedicated strobe. The Nikonos V accepts a wide range of accessories, and is tested to 160 feet.

For the best on-land photography, Nikon's two new cameras, the N2000 and One Touch, can't be beat. The remarkable N2000 features a built-in motor drive, auto film loading, 4 exposure modes including 2 full programmed modes, auto DX film speed indexing, and a full information viewfinder. As part of the Nikon system, the N2000 is compatible with a variety of special accessories. The compact Nikon One Touch is so easy to operate, you'll want to take it everywhere! It features infrared auto focusing, auto film loading, advance and rewind, auto DX film speed indexing, pop-up flash and a unique built-in lens cover. For more fine Nikon products, turn the page.



Nikonos V. Featured on the cover.

- 10070 Nikonos V, orange, body only
w/FREE dive light **299.00***
- 10071 Nikonos V, green, body only
w/FREE dive light **299.00***
- 10072 Nikonos V w/35mm f2.5
FREE dive light **383.00***
- 10074 Nikonos V w/28mm f3.5
(orange body) FREE dive light. . . **463.00***

Helix Special Packages.

- Nikonos V package w/35mm f2.5,
dive light and equipment case . . . **404.00***
- Nikonos V package w/35mm f2.5,
dive light, equipment case and
Nikonos close-up outfit **519.00***
- Nikonos V package w/35mm f2.5,
dive light, equipment case,
Aquafash 28 & light mount **719.00***
- Nikonos V package w/35mm f2.5,
dive light, Nikonos SB-103
w/case and extension tube set . . . **729.00***
- Nikonos V package w/35mm f2.5,
dive light, equipment case,
Nikonos close-up outfit,
Aquafash 28, light mount
& Underwater Photography Book . **829.00***

*NIKONOS V OFFER

With the purchase of a Nikonos V, get a FREE set of extension tubes plus a \$100 travel certificate from Nikon. The travel certificate is good at 7 top Caribbean dive resorts. Or, purchase a Nikonos SB-102 or SB-103 with the Nikonos V and receive an additional \$100 travel certificate! Call our Underwater Department at 800/33-HELIX for details.

Nikonos Lenses.

- 10315 15mm f2.8 UW Nikkor IC . . . **699.00**
- 10314 20mm f2.8 UW Nikkor **339.00**
- 10310 28mm f3.5 UW Nikkor IC . . . **164.00**
- 10311 35mm f2.5 UW Nikkor IC . . . **84.00**
- 10312 80mm f4 UW Nikkor IC **164.00**
- 10313 28mm f2.8 Nikkor LC
for land use **129.00**

Filters for Nikonos.

- 2265 CC30F **14.00**
- 2402 Skylight (L-1BC) **19.80**
- 2295 Light Yellow (Y-44) **14.00**
- 2399 UV haze **14.40**
- 10625 Lens hood/filter holder for
35.80mm **3.25**

Nikonos Close-up Outfit. For parallel-free underwater close-up shots at 9 1/2" subject distance. For Nikonos V and all earlier models.

- 10705N Basic Close-up outfit, w/o
case **125.00**
- 10705 Deluxe Close-up outfit w/case **155.00**

- NIK-CL Close-up lens only for NIK I, II
III, IV (repl.) **65.00**
- NIK-TB Short rail/top brace (repl.) . . **23.95**
- NIK-FH Long rail/frame holder (repl.) **35.00**
- NIK-F28 28mm framer (repl.) **21.95**
- NIK-F35 35mm framer (repl.) **21.95**
- NIK-F80 80mm framer (repl.) **21.95**

Your old close-up outfit doesn't fit your new Nikonos V? Helix can upgrade your system. Call the Underwater Department for more information.

Cases for Nikonos

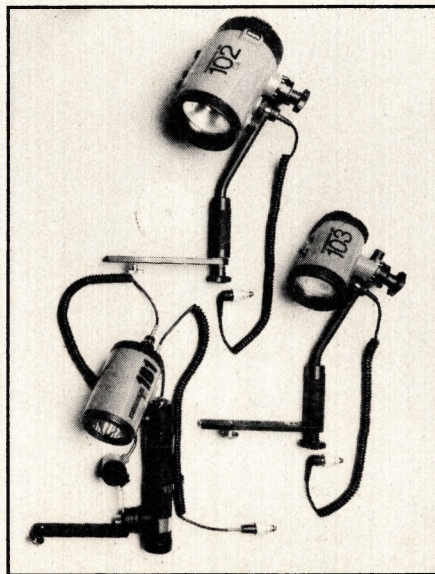
- 10420 Carrying case for Nikonos IV
and V **24.95**
- 10414 Eveready case for Nikonos III
w/35mm, 28mm **19.50**
- 10415 Eveready case for Nikonos II
w/35mm, 28mm **17.50**
- 10418 Lens case, f/35mm IC **14.00**
- 10419 Lens case, f/80mm IC **21.00**

Miscellaneous

- 10713 O-ring set f/Nik V **5.40**
- 10714 O-ring set f/Nik IV-A **5.40**
- 10715 O-ring set f/Nik III. **4.50**
- 10716 O-ring set f/Nik I, II **7.30**

Nikonos Viewfinders.

- 10758 15mm optical Viewfinder (U/W
use only) **149.00**
- 10751 28mm sportsfinder **11.60**
- 10753 35/80mm sportsfinder **12.00**
- 10756 80mm optical viewfinder
(topside use only) **57.50**
- 10759 20/28mm optical viewfinder
DF12 (U/W use only) **98.50**
- 10755 28/35mm optical viewfinder
(U/W use only) **92.50**



Nikonos Speedlight SB-101. The handle mount SB-101, for Nikonos III, IV, V offers automatic exposure (non-TTL) control and a remote sensor that can be totally disconnected from the strobe (for manual use only). The SB-101 features a 2 f/stop auto range and manual, full and 1/2 power settings, GN 50 at ASA 25 topside, and 20 at ASA 64 underwater. Pressure-tested up to 160'.

- 10740 Nikonos Speedlight SB-101
w/o case (limited quantities) **269.00**
- 10747 Nikonos Speedlight SB-101
w/case & diffuser (limited quantities) **299.00**

Nikonos Speedlight SB-102. When combined with the Nikonos V, the Speedlight's automatic TTL flash exposure control regulates flash output. Accepts six Nicad or C-type alkaline batteries.

- 10102 Nikonos Speedlight SB-102
w/case and diffuser **549.00**

Nikonos Speedlight SB-103. Designed for the Nikonos V, this underwater strobe features TTL (through-the-lens) autoexposure control. Aperture ranges from f2.8 to f22 with ASA ISO 100 film. In manual mode, the SB-103 may also be used with the Nikonos IV-A or Nikonos III. Uses four Nicad or AA-type alkaline batteries. Pressure tested to 160'.

- 10103 Nikonos Speedlight SB-103. . . **285.00**

Nikonos Speedlight Accessories.

- 10725 PC flash adapter (on land)
for Nikonos II, limited quantities . . **18.50**
- 10729 PC flash adapter (on land)
for Nikonos IV, V **19.50**
- 10204 Double TTL sync cord
for SB-102, 103 **85.00**
- 10201 Double bracket set for
SB-102/103 **194.00**
- 10214 Double bracket (tray) **88.00**
- 10203 Extension arm set for
SB-102/103. **85.00**
- 10711 O-ring set w/silicone for SB-103 **5.40**
- 10712 O-ring set w/silicone for SB-102 **5.40**
- 10200 Protector for SB-102 **42.50**
- 10746 SU-101 Remote auto sensor
f/SB-101/102 **58.50**

SPECIAL PURCHASE FOR NIKONOS I, II or III OWNERS

Nikonos underwater flash gun for
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and bulb)

- SPECIAL. **49.00**

Nikonos underwater flash gun for
Nikonos III (requires batteries
and bulb).

- SPECIAL **59.00**

On Land

Helix carries a large inventory of Nikon equipment and accessories, both new and used. For information on topside items not listed, please write or call our 35mm Department at (312) 944-4400.

NEW Nikon N2000. Featured on the cover.

- Nikon N2000, black body only **199.95**
- Nikon N2000, with 50mm f1.8E lens **259.95**
- Nikon N2000, with 50mm f1.4
AI-S lens **339.95**

NEW Nikon One-Touch. Featured on the cover.

- Nikon One-Touch w/35mm f2.8 lens **139.00**

Nikon Compact Binoculars. Nikon's high-quality optics allow for clearer, sharper vision. The compact series of binoculars provide plenty of magnification power in an extremely small size, making them perfect for concerts, sporting events, and other attractions.

- Nikon 7x20CF compact binoculars. . . **59.00**
- Nikon 9x25CF compact binoculars . . **69.00**
- Nikon 10x25CF compact binoculars . . **89.00**

*"Nikon Inc. U.S.A. limited warranty
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Subsea



*Subsea Mark 30 (N/A),
100, 150 w/cords*

Subsea Mark 100. The Mark 100 offers a 90° beam angle, full, and ½ power settings. Recycles in 3-6 seconds. Like all Subsea strobes, the Mark 100 features a non-corrosible O-ring sealed epoxy housing which allows operation to a depth of 350'. Requires optional no. 493 or rechargeable battery, arm and tray.

- 100 Subsea Mark 100 strobe, EO . . . **329.00**
- 102 Subsea Mark 100 strobe for
Nikonos I/II . . . **315.00**
- 103 Subsea Mark 100 strobe for
Nikonos III/IV/V . . . **315.00**
- 104 Subsea Mark 100RG rechargeable
strobe w/charger, EO . . . **345.00**
- 105 Subsea Mark 100RG rechargeable
strobe w/charger f/Nik II . . . **335.00**
- 106 Subsea Mark 100RG rechargeable
strobe w/charger f/Nik III,IV,V . . **335.00**

Subsea Mark 150. This newly redesigned system offers user-replaceable sync cord and

features three different power output settings of 50, 100, and 150 watt-seconds. The Mark 150 also has a built-in slave sensor cell and an adjustable light beam angle (90°-150°). Mark 150 RG also features a user-replaceable circuit board. It weighs just 6½ ounces in water and operates to 350'. Requires optional no. 497 or rechargeable battery, arm and tray.

- 147 Subsea Mark 150 strobe, EO . . . **459.00**
- 148 Subsea Mark 150 strobe
for Nikonos I/II . . . **449.00**
- 149 Subsea Mark 150 strobe for
Nikonos III/IV/V . . . **449.00**
- 144 Subsea Mark 150RG rechargeable
strobe w/charger, EO . . . **459.00**
- 145 Subsea Mark 150RG rechargeable
strobe w/charger f/Nik II . . . **449.00**
- 146 Subsea Mark 150RG rechargeable
strobe w/charger f/Nik III,IV,V **449.00**

Subsea Mounting Accessories.

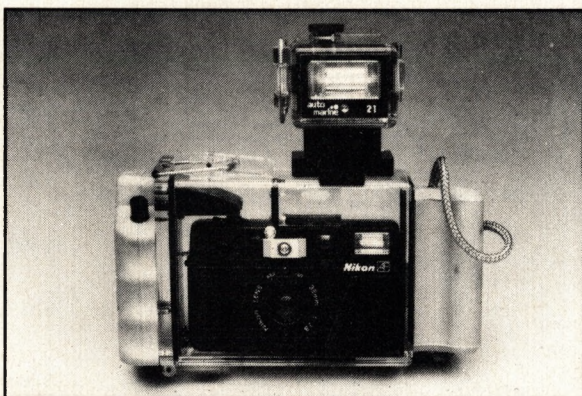
- 351 Flexible arm **70.00**
- 151 Universal arm, 17" **66.00**
- 151B Universal arm, blue **72.00***
- 051 Standard arm, 12" **52.00**
- 052 Nikonos II,III tray **16.50***
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- 061 Universal Nikonos II,III,
IV, tray **22.25**
- 172 Double Nikonos II/III tray. . . . **31.50***
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bracket **17.00**
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L-158, L-188) **18.75**
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Subsea Accessories.

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- 497 Battery f/Mark 150 **31.95**
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- 292 Charger for Power pack 200
(repl.) **28.95**
- 293 Fast charger for Power pack 200
(repl.) **56.00**
- 301 Strobe jacket f/Mark 150 blue,red **28.00**
- 302 Strobe jacket f/Mark 150
blue/yellow **28.00**
- 152-2 Nikonos II EO adapter **63.50**
- 152-3 Nikonos III EO adapter **63.50**
- 401 O-ring kit f/Mark 100 (repl) **9.00**
- 402 O-ring kit f/Mark 150 (repl) **9.00**
- 258 Exposure guide f/Mark 100 **5.25**
- 257 Exposure guide f/Mark 150 **5.25**

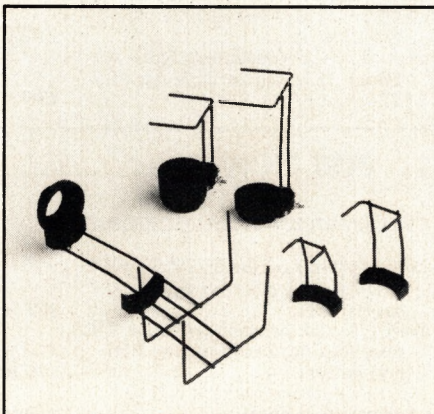
* Limited quantities

Helix



*Top left: Helix Auto-Marine II Housing
w/Auto-Marine 21
Slave Strobe and
Nikon L35AF*

*Bottom left: Helix
Extension Tubes*



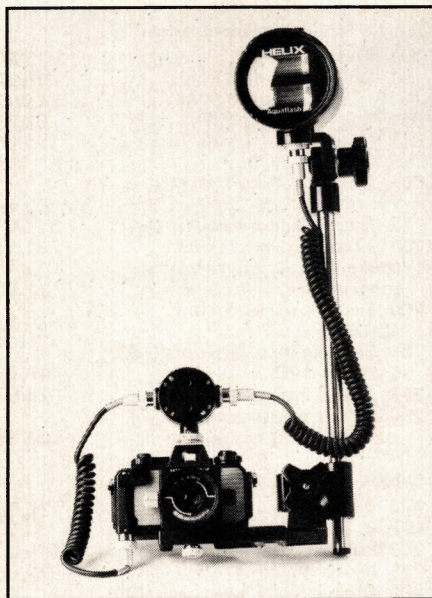
Helix Auto-Marine II Housing. Autofocus cameras offer superior 35mm photographic results without frustrating guesswork. And underwater photographers will find the Helix Auto-Marine II the perfect housing to protect their autofocus cameras. This housing features a built-in viewfinder and patented prism I.R. regulator for easier underwater focusing. The regulator may be switched off when shooting photographs topside. The Auto-Marine II is constructed of durable acrylic resin and stainless steel and requires minimum maintenance. Includes yellow rubber hand grips and lanyard strap. Pressure tested to 100 feet. May be used with the Nikon L35AF, New Canon Sure Shot, Canon AF35M and Canon AF35ML.

- Helix Auto-Marine II Housing **84.50**
(please specify camera)

- Helix Auto-Marine 21 Slave Strobe. . **69.95**
- Helix/Nikon Package w/Auto-Marine
II Housing & Nikon L35AF. **209.00**

Helix Extension Tubes. With just three tubes and seven framers, Helix extension tubes form the most versatile close-up system available. You can make seven different combinations for 2:1, 1:1, 1:2 and 1:3 reproduction with a 35mm lens, plus 1:1, 1:1.8, and 1:2.75 with a 28mm lens. The epoxy-coated stainless steel framer connects to the extension tube with a knurled knob. Constructed of black anodized aluminum, each extension tube easily attaches between your Nikonos camera and lens.

- HUP-230 NEW Helix basic set for 28mm
w/2 tubes and 3 framers (1:1, 1:8,
1:2.75) **75.00**
- HUP-122 Helix basic set for 35mm
w/2 tubes and 3 framers (1:1, 1:2,
2:1) **75.00**
- HUP-123 Helix deluxe set for 35mm
w/3 tubes and 4 framers (2:1, 1:1,
1:2, 1:3) **105.00**
- HUP-124 Helix master set w/3 tubes
and 6 framer for 28mm (1:1.8, 1:2.75)
and 35mm (1:1, 1:2, 2:1, 1:3) . . . **139.00**
- HUP-311 Helix 1:1 tube and framers
for 35mm **29.50**
- HUP-312 Helix 1:2 tube and framer
for 35mm **29.50**
- HUP-313 Helix 1:3 tube and framer
for 35mm **29.50**
- HUP-212 Helix 1:1.8 tube and framer
for 28mm **29.50**
- HUP-213 Helix 1:2.75 tube and framer
for 28mm **29.50**



Helix Aquaflash 28. The Aquaflash 28 functions in both automatic and manual exposure modes down to 165 feet. It twin-flash reflector is designed for wide, even underwater lighting and will cover a 28mm lens. The reflector also provides softer lighting for macro photography. A sensor module with built-in slave mounts on the camera's accessory shoe for hand-held operation with full auto-exposure control. The Aquaflash 28 performs in two manual flash settings: full and 1/4. Tilt and swivel controls on the flash arm allow for a variety of lighting techniques. Thyristor circuitry provides quick recycling time and drains battery power supply less than normal circuitry. The all-weather flash, designed for the Nikonos III, IV, or V is also equipped with a mounting tray, arm and coiled interchangeable sync cord. Its underwater exposure with ASA 100 film is f11 at 3 feet and f12.5 at 10 feet topside. Uses 6 "AA" size alkaline or Nicad batteries. A 2-year limited warranty is included.

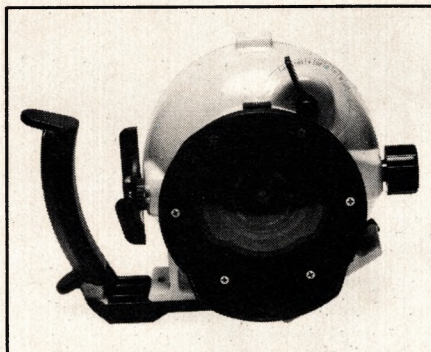
Helix Aquaflash 28 includes mounting tray and connector cables (specify Nikonos I/II, III/IV/V) **329.00**
Helix Aquaflash 28 includes mounting tray and connector cables (specify EO or ICS) **339.00**

Helix Aquaflash Accessories.

HUP-HOC Repl. outer battery cap. **5.95**
HUP-HIC Repl. inner battery cap. **5.95**
HUP-HSP Repl. sync plug **4.95**
HUP-HMB Repl. camera mount bolt **5.95**
HUP-HCT Repl. camera tray **49.95**
HUP-HMA Mount arm, 18" (repl.) **9.95**
HUP-HSA Short arm, 8" **9.95**
HUP-HLM Light mount **10.50**
HRC Repl. cord (specify Nik, I, II, III, IV, V) **39.95**
HRC-EO Repl. cord (EO or ICS) **59.95**
HOK-22 O-ring kit f/Aquaflash 22 or 28 **4.95**
HUP-WAA 15mm WA adapter **27.95**

Helix EO Connectors.

HUP-EOII Helix 6" EO to Nikonos II/II **52.00**
HUP-EOIII Helix 6" EO to Nikonos III/IV/V **52.00**
HEO-EXT 10ft. male/female EO **95.00**
HEO-EXT 20ft. male/female EO **99.00**



Helix/Kamba SLR Housing. Designed for use with Canon's A-1, AE-1, AE-1 Program, AV-1 with A or A2 power winder, this housing features reflex focusing and allows external operation of shutter release and aperture. It has a standard dome port for 17.100mm lenses and accepts a number of optional ports, including a wide angle and macro port. It is also available with a Nikonos II or Nikonos III/IV sync socket connector. The body, made of sturdy lexan, is pressure tested to 200', and is supplied with grease, tools, O-rings and standard focusing rings, as well as a +4 diopter filter that fits 52mm threaded lenses that do not meet minimum focus req.

of the dome port. The housing has a convenient side handle for easy carrying, and weighs less than 6 lbs. without camera.

Helix/Kamba housing **299.50***

Helix/Kamba Package. This package features the Canon AV-1 camera with 28mm f2.8 Canon lens which features aperture-preferred automatic exposure and shutter speeds to 1/1000th of a second. Also included is the Canon Winder A. The Kamba underwater housing designed specially for the Canon AV-1 is described above.

Helix/Kamba package **399.50***

Helix/Kamba Deluxe Package, same as above, but also includes Helix Aquaflash 28 and bracket **699.50***

Helix/Kamba Accessories.

HK-VIF Internal viewfinder **53.50**
HK-ORK O-ring set (2-rings) **10.00**
NK-GAP Repl. aperture gear **16.00**
HK-GFS Repl. standard focus ring **16.00**
HK-GFW Focus ring for 17 or 20mm **16.00**
HK-SP Repl. standard dome port **135.00**
HK-SMP Macro port **135.00**
HK-WP Extra wide dome port **135.00**
HK-UNI Universal mount flash bracket **18.00**
HK-HAF Aquaflash mount flash bracket **18.00**

***SPECIAL-limited quantities!**

Used Equipment

Helix has a large inventory of all types of used equipment. Each item is thoroughly checked before being priced, and most come with a Helix 6-month warranty. Equipment marked "As Is" cannot be warrantied. Plus, all used equipment is sold subject to your approval. Please call us at 800/33-HELIX to find out what's currently available in used underwater items.

Helix Used Equipment Budget Packages

Nikonos III w/35mm f2.5, Nikonos bulb flash, arm, flash bulbs & batt. **349.00**
Nikonos II w/35mm f2.5, Sea & Sea YS-20 strobe, arm & tray **389.00**
Nikonos IV w/35mm f2.5, Popular F-3 auto/manual strobe, arm & tray **399.00**
Nikonos III w/35mm f2.5, Popular F-3 auto/manual strobe, arm & tray **449.00**

Helix Used Equipment Deluxe Packages

Nikonos IV w/35mm f2.5, Aquaflash 22 auto/manual strobe, arm, tray & case (18x13x8") **499.00**
Nikonos III w/35mm f2.5, Aquaflash 22 auto/manual strobe, arm, tray & case (18x13x8") **549.00**
Nikonos V w/35mm f2.5 Aquaflash 22 auto/manual strobe, arm, tray & case (18x13x8") **549.00**
Nikonos IV w/35mm f2.5, Sunpak Marine 32 strobe, tray & Oceanic extension tube set **499.00**
Nikonos III w/35mm f2.5, Sunpak Marine 32 strobe, tray & Oceanic extension tube set **549.00**
Nikonos V w/35mm f2.5, Sunpak Marine 32 strobe, tray & Oceanic extension tube set **549.00**
Nikonos IV w/35mm, Sea & Sea YS-50A auto strobe, arm & tray **539.00**
Nikonos III w/35mm f2.5, Sea & Sea YS-50A auto strobe, arm & tray **609.00**

Nikonos II w/35mm f2.5, Sea & Sea YS-150 strobe, Nicad, charger, arm & tray **589.00**
Nikonos IV w/35mm f2.5, Sea & Sea YS-150 strobe, Nicad, Charger, arm * tray **625.00**
Nikonos III w/35mm f2.5, Sea & Sea YS-150 strobe, Nicad, charger arm & tray **689.00**
Nikonos V w/35mm f2.5, Sea & Sea YS-150 strobe, Nicad, charger arm & tray **695.00**
Nikonos III w/35mm f2.5, SB-101 auto/manual strobe, tray, case & diffuser **595.00**
Nikonos IV w/35mm f2.5, SB-101 auto/manual strobe, tray, case & diffuser **549.00**
Nikonos V w/35mm f2.5, SB-101 auto/manual strobe, tray, case & diffuser **595.00**
Helix/Kamba Housing w/Canon AV-1, 50mm f1.8 & winder A (demo-limited quantities) **379.00**
Helix/Kamba Housing w/Canon AV-1 50mm f1.8, Aquaflash 22 & winder A **549.00**
Helix/Kamba Housing w/Canon AV-1 28mm f2.8, Winder A & Aquaflash 22 **585.00**

... and New

110 CAMERAS AND ACCESSORIES

Ikelite/Vivitar package w/Vivitar 845, 110 housing, close-up lens and sportsfinder **103.95**
Ikelite/Kodak package w/Kodak 3100, disc housing, 2 rolls of disc film, and battery **85.95**
Ikelite/Keystone package w/110 camera and housing **79.50**

New Equipment

Ikelite housing for Kodak disc 2000, 3000, 3100, 3500, 4000	47.95
Ikelite housing for Vivitar 830, 840, 835, 845	48.00
Hanimex Penguin housing for Kodak Disc 4000 (rated to 12 ft.)	12.00
Sea & Sea Pocket Marine 110	99.50
Sea & Sea/Ikelite package with 110 camera, Substroke S and arm	197.50
Sea & Sea package with 110 camera, Sealoc bulkhead, YS-20 strobe and arm	230.00
Sea & Sea/Ikelite package with 35mm camera, Substroke S and arm	267.50
Sea & Sea Motor Marine 35	169.50

HOUSINGS AND ACCESSORIES

Aquatica 3N Professional aluminum housing for Nikon F3 with action and motor, incl. dome port, EO bulkhead, and internal light	1495.00
Oceanic Hydro 35 housing w/EO for Canon F-1 (old) Nikon F, F2, F3	999.00
Ewa U-F housing for 35mm SLR w/winder, 8x5x6 1/2"	68.00
Ewa U-FXP housing for 35mm SLR w/winder, strobe, or zoom lens, 9x6x7 1/2"	78.00
Ewa U-FXM housing for Canon A-1, w/motor, or Nikon FM, FE w/motor, 6 1/2x5 1/2x7"	87.00
Ewa U-H housing for Hasselblad, Bronica	104.00
Ewa U-AL housing for disc camera	19.95
Ewa U-AFM housing for compact auto-focus camera with close-up lens	48.50
Ewa U-VB housing for Sony or Sanyo Beta Movie	159.00
Ewa U-JVC housing for JVC or Zenith Video Movie	159.00
Hugyfot UFOMARIN aluminum housing for Olympus OM-1, 2, w/EO or Nik III/IV connector	339.00
Hugyfot UFOMARIN housing for Nikon EM, FG	339.00
Hugyfot Professional 38 aluminum housing for Nikon F3 with DA-2 finder and motor (port opt.)	1325.00
Ikelite 6520 housing for Nikon F and FTN	199.00
Ikelite Super-Eye housing for Canon A-1, AL-1, AE-1 Program	279.95
Ikelite Super-Eye housing for popular brands of SLR cameras	279.95
Ikelite housing for SLR camera w/action finder	239.00
Sea & Sea aluminum housing for Nikon F2	795.00

STROBES AND ACCESSORIES

Ikelite Substroke S for Hanimex/Sea & Sea	98.00
Ikelite Substroke S with Nelson connector	123.00
Ikelite Substroke M (req. optional sync cord)	94.00
Ikelite Substroke MV TTL w/cord	199.00
Ikelite Substroke 100 TTL w/cord	310.00
Ikelite Substroke 150 TTL w/cord	422.95
Ikelite/Vivitar package w/Vivitar 283 and housing	125.00
Ikelite/Vivitar package w/Vivitar 285 and housing	144.00
Ikelite housing for Vivitar 283/285	79.95
Ikelite housing for Vivitar 3500	79.95
Sunpak Marine 32	209.00
Oceanic 2000 (specify Nik II, III, IV, V)	126.50
Oceanic 2000 with EO	149.50
Oceanic 2000 slave with handle	126.50
Oceanic 2001 with EO	315.00
Oceanic 3000 TTL w/cord	510.00

Oceanic 3002 with auto, & Nik III, IV, V cord	578.00
Oceanic 3003 with slave (req. optional cord)	412.00
Oceanic EO slave adapter	89.00
Sea & Sea YS-20 for Nik I, II	89.00
Sea & Sea YS-20 with Sealoc	89.00
Sea & Sea YS-50 Auto for Nik III, IV, V	220.00
Sea & Sea YS-150 w/slave for Nik II	299.00
Sea & Sea YS-150 w/slave for Nik III, IV, V	299.00

FINDERS FOR NIKONOS

Ikelite optical viewfinder	67.50
Ikelite Sportsfinder	7.20
Oceanic optical viewfinder for Nik III	45.00
Sea & Sea optical viewfinder (18, 28, 35)	39.00

CLOSE-UP AND ADD ON LENSES FOR NIKONOS

Hydro Photo T-1, T-2 or T-3 close-up for 35 UWN (specify)	39.95
Hydro Photo 1228 close-up lens for 28 UWN	39.95
Hydro Photo focusing wand for T-1, T-2	14.50
Hydro Photo framer for 28 or 35 UWN (specify)	14.50
Subawider II 21 mm w/optical viewfinder (for 35 UWN)	199.00

LIGHT METERS AND HOUSINGS

Ikelite housing for Gossen Super Pilot	39.95
Sea & Sea light meter	69.00
Sekonic L-164B Marine Meter II	84.50
Sekonic L-158 WH meter w/housing	41.00
Sekonic L-188 WH meter w/housing	54.00

EQUIPMENT CASES AND BOXES

AquaCraft Goody box, 3x5 1/2x8 1/2"	6.95
Helix Accessory Tote, 9x4x5"	4.95
Helix Equipment case, 18x13x8	39.95
Ikelite Photo case, 13x17x7"	60.00
Pellicase, black or gray 12 1/2x9 1/2x5 1/2"	49.00
Pelican equipment case, black, 17 1/2x11-7/8x6 1/2"	74.50
King Pelican case, black or gray, 22x17x8"	119.00
Pelican box	11.95
Pelican box with foam	14.40
Subsea Equipment case, 18x13x12"	178.00
Subsea Equipment case, 18x13x8"	159.00

PHOTO/DIVE LIGHTS

(non-rechargeable, batteries not included)

Helix HUP-200 Photo/dive light (req. 2 "D")	14.95
Helix HUP-205 Mini dive light (req. 2 "AA")	9.75
Helix High intensity conversion kit for HUP-200	4.95
Ikelite Mini C lite (req. 4 "C")	17.50
Ikelite Mini C halogen lite (req. 4 "C")	22.50
Ikelite Mini C Mark strobe beacon	44.00
Ikelite Modular Super Lite, clear or black case, req. charger	179.00
Ikelite Modular handle on pistol grip	7.95
Pelilite with krypton lamp	14.95
Toshiba K-133 with spare halogen (req. 4 "D")	27.95
Toshiba K-132 with spare krypton (req. 4 "D")	21.95
UW Kinetics Super-Q with charger	43.00
UW Kinetics QXL-3R with charger	48.00
UW Kinetic QXL-3 light (req. 3 "C")	18.00

MISCELLANEOUS ACCESSORIES

Helix Audible water detector kit	29.95
Helix Audible water detector kit w/LED	39.95
Helix digital disposable dive watch (mens or ladies)	7.95
AquaCraft Nikonos lens focuser	20.50
AquaCraft camera safety line, 18ft.	12.95
AquaCraft camera lanyard	5.50
AquaCraft large mesh tote bag	16.75
Beall reel with 100 ft. line	13.75
Beall Nik III thumb release	8.95
Beall wrist lanyard	4.95
Beall slate	4.50
Beall slate with pencil	8.10

MOVIE AND VIDEO

Eumig Nautica S-8, 18 fps	189.00
Helix Nautica single light mount	32.00
Helix Nautica double light mount	39.95
Fujica P2 with housing, 18 fps.	99.00
Ikelite modular 100W movie lite (req. charger)	187.00
Ikelite spare modular nicad	119.00
Ikelite housing for JVC GZ-S3 and HRC3	539.00
Ikelite housing for JVC TM-P3U 3" monitor	240.00
Ikelite/JVC package with housing, GZ-S3, HR-C3, nicad, charger and tape	1945.00
Ikelite housing for JVC GR-CIU video movie	515.00
Ikelite /JVC package with housing, JVC video movie, nicad and charger	1765.00

Sea & Sea CL-80 80W light w/charger	260.00
Sea & Sea spare CL-80 nicad	127.00
Subatec Model 180 (100W/54 minutes)	425.00
Subatec Model 500 Twin Head (2 at 100W/110 minutes)	995.00

Helix Video Transfer Service
Super 8, Reg. 8 16mm to VHS/Beta slides
negative to VHS/Beta plus titles, music
fades and wipes

Call or write for complete details
and price list

Fuji/Helix Introductory Package
with Fuji P-2 movie camera, housing,
4X Fujichrome R25 film, processing
Beta or VHS tape and up to 200' of
film to video transfer.

\$ 149.00

TELESCOPES AND BINOCULARS

Bausch & Lomb 4000 telephoto (1200mm f12)	309.00
Bausch & Lomb spotting scope w/porro prism	359.00
Bausch & Lomb Observatory w/clock drive	549.00
Helinon 2" Refractor telescope w/wood tripod	125.00
Helinon 4 1/2" Reflector telescope w/wood tripod	249.00
Helinon 8x30 Roof Prism	79.00
Helinon 8x40 Roof Prism, armored	89.00
Helinon 11x80 w/case	145.00
Helinon 20x80 w/case	160.00
Helinon 30x80 w/case	170.00
King 12x50 with case	59.00
King 16x50 with case	69.00
King 20x50 with case	89.00

Hanimex 110 Amphibian. This simple-to-use camera takes 110 drop-in film cartridges for easy loading. It features built-in 1 frame per second motorized film advance, built-in electronic flash, manual metering with 2 exposure settings, and a high-quality 20mm f4.0 fixed focus wide-view lens. The rugged Amphibian body is bright yellow for easy visibility, and may be used underwater to 150 feet. Features a 1/125th second speed and is powered by 2 AA batteries. The Hanimex 110 is compact and extra light-weight, and also makes a great topside camera for the beach, skiing, boating or anywhere else that would be too risky to take a conventional camera.

Hanimex 110 Amphibian **89.50**
Hanimex 110 and slave strobe package. **185.00**

Hanimex Macro Lens and Wand 110. You can expand the photographic capabilities of your Amphibian 110 with this easily attachable macro lens and wand. It connects to the camera via an anodized screw, and allows you to photograph a subject as close as 5 1/2" away.

Hanimex Macro Lens and Wand 110 . . . **35.00**

Hanimex Close-Up Lens 110. This close-up attachment changes the focusing point of the 110 Amphibian camera from 3 1/2' to 2'. Attaches to lens via an anodized screw. Black.

Hanimex Close-up lens 110 **26.75**

Hanimex 110 Accessories.

O-ring (replacement) **3.95**
Silicon lube **2.95**

Hanimex 35 Amphibian. Now you can have the same all-weather protection of the 110 Amphibian in a versatile 35mm camera.

This rugged camera is built to withstand water pressure down to a depth of 150', and also offers protection against dirt, dust, and sand. Powered by 2 AA batteries, the 35 Amphibian incorporates a 1 frame per second film motor drive, a built-in electronic flash, fast variable focus 4 element 35mm f2.8 lens, and a programmed shutter with speeds from 1/60th second at f2.8 to 1/500th second at f16. LED over and under exposure warning signals, plus GO light, appear in the viewfinder to aid in obtaining a correctly exposed photograph. Accepts a variety of Hanimex accessories. Orange.

Hanimex 35 Amphibian **157.50**

Hanimex 35 Accessories.

Carrying case **15.00**
O-ring (replacement) **3.95**
Nelson female bulkhead **21.50**
Wide angle lens adapter, NEW **89.50**

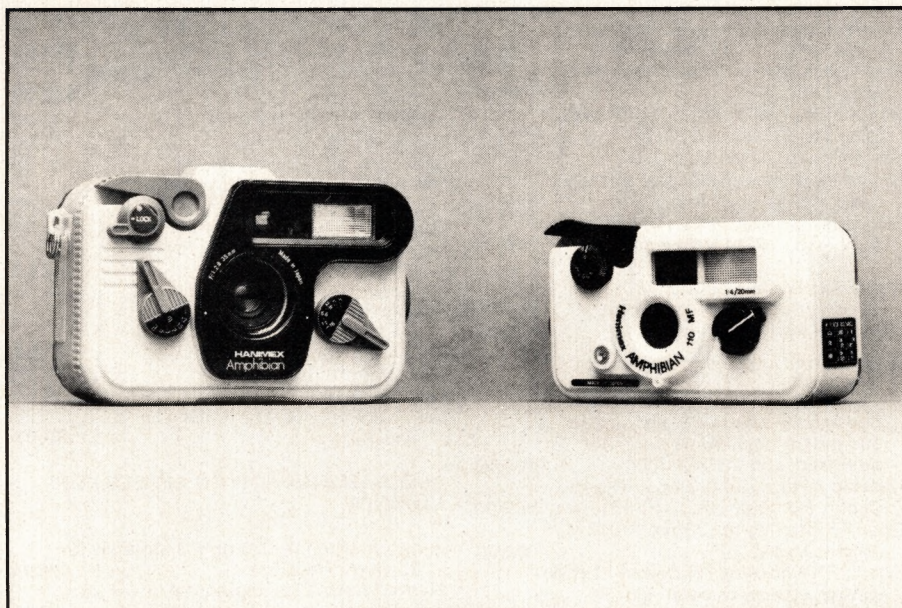
Hanimex Macro-Lens and Wand 35. For use with the 35 Amphibian, this attachment allows close-up photography as close as 6 1/2". The subject-to-image ratio at this distance is 1:3. The macro lens threads directly onto the 35 lens via a double ring system. The spring-load wand disassembles into 2 compact parts for easier packing. Includes case.

Hanimex Macro lens and wand 35 . . . **44.00**

SPECIAL

Helix Hanimex 35 package. Includes 35 Amphibian camera, 9x14x5" equipment case, and Hanimex slave strobe with arm.

\$ 269.50



Hanimex 110 & 35mm Amphibian cameras



Hanimex Slave Strobe

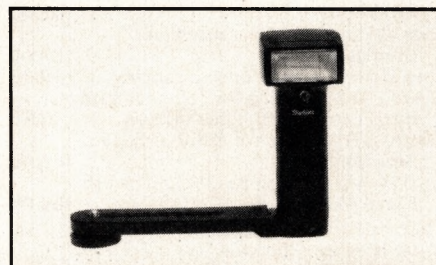
Hanimex Slave Strobe. This auxiliary flash may be used with either Hanimex Amphibian camera to expand your range of underwater photographic opportunities. Since the slave is triggered by the camera's built-in flash, no extra cords or connections are needed. Features a guide number of 15 with ISO 100. Uses 4 AA alkaline batteries, which can provide up to 550 flashes per set. May also be used on land. Orange.

Hanimex Slave Strobe (specify 110 or 35) **98.00**

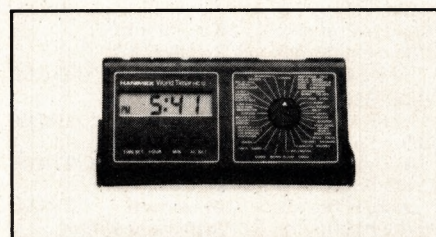
Hanimex Filter Adapter Ring. For use with the 35 Amphibian, this adapter allows 46mm filters to be used on the lens. Specially designed to allow water to flow through, so no air bubbles may form.

Hanimex Filter Adapter Ring **5.95**

Hanimex Wide-Angle Lens for Nikonos. Designed as a supplement to the Nikonos II, III, IV, V 35mm lens, this wide angle attachment allows the entire image to be in focus as close



Hanimex Starblitz 18GM



Hanimex Universal World Timer

as 12 inches from the lens. Sportsfinder is included for accurate framing.

Hanimex Wide Angle lens for Nikonos . **94.50**

Hanimex Universal World Timer. A great gift for that busy executive on your list, this desk top world time alarm clock displays the time in all 24 time zones around the world in a.m. or p.m. at a flick of a finger. 57 major cities are indicated on the face of the clock for reference, and the built-in alarm can be set for any city. 1/2 inch LCD readout allows for easy viewing. Comes complete with battery and sliding cover/stand. Hanimex Universal World Timer (black). **24.95**

Hanimex Starblitz 18GM. For on land use, the 18GM features a built-in grip and 90° bounce head. This unit acts as a slave to extend the range of any 35mm camera with a built-in flash, or to provide softer lighting effects by bouncing light. GN of 60 with ISO 100, requires 2 AA batteries.

Hanimex Starblitz 18GM **19.95**

Best Dive Spots

For years, Helix has been offering exciting Photo/Dive trips to exotic locations around the world. Our trips are so successful because we team up with the world's top dive tour specialists, Poseidon Ventures. Helix and Poseidon give you the most popular dive locations, plus the best boats, accommodations, and equipment at prices that are hard to beat.

Helix Photo/Dive trips booked through Poseidon include plenty of diving opportunities (sometimes up to 6 dives daily), along with most necessary diving equipment, deluxe accommodations, meals, informal photographic instruction and assistance, plus use of many Helix underwater accessories to enhance your photos. In 1986, Helix Photo/Divers can take the plunge in Bonaire from Jan. 26th through Feb. 2nd, or dive the Philippines from March 23rd through April 8th, and catch a spectacular view of Halley's comet. Call us at 800/33-HELIX for more information.

Besides Helix Photo/Dive trips, Poseidon Ventures also conduct dive tours to other outstanding locations such as the

Red Sea, Micronesia and more. When you dive, dive with the best, Helix and Poseidon. And don't forget your Nikon \$100 Travel Certificates can be used on Helix/Poseidon trips to specified resorts.



"La Strega"

Philippines

Micronesia and Great Barrier Reef rolled into one destination . . . dive in luxury from our exclusive live-aboard diving yacht, the 120 ft. "Lady of the Sea"

Micronesia

PALAU, TRUK LAGOON, PONAPE- Without question the best diving in the world! Palau, fabulous reef diving. Truk Lagoon, wreck divers paradise. Scheduled and independent departures.

Red Sea

Live-aboard diving programs to Ras Muhammed, Straits of Tiran and more from Lady Jenny V from Shareem El Shiekh.

Australia

To Great Barrier Reef and Coral Sea on Coral Princess and others. Compare our prices!

Belize

Live-aboard the "La Strega" to Lighthouse Reef and more!

Cozumel

CHECK OUR LOW PRICES!

Bonaire— Flamingo Hotel

Roatan— Anthony's Key, Coco View

Grand Cayman— Resort of your choice

Haiti— Kaliko Beach Hotel

Please send me information on these tours:

☐ Red Sea ☐ Micronesia ☐ Tahiti ☐ Australia ☐ Belize
☐ Philippines ☐ Caribbean ☐ Photo/Dive Tours

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POSEIDON VENTURE TOURS

Outside Calif. call (800) 854-9334, 359 San Miguel Dr.,
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Suite 675, Houston, TX 77060, (713) 820-3483

Poseidon Ventures

Books

UNDERWATER PHOTOGRAPHY

Beginning Underwater Photography by Jim and Cathy Church. A guide to underwater photography, covering both equipment and techniques.
Beginning Underwater Photography . . . 6.50

Choosing and Using Underwater Strobes by Jim and Cathy Church. Describes techniques and methods in choosing an underwater strobe best suited to your needs.
Choosing and Using Underwater Strobes . . . 7.95

Howard Hall's Successful Underwater Photography. This new and different approach shows the easiest and best way to begin or improve your underwater photographic style.
Howard Hall's Successful Underwater Photography . . . 14.95

Mastering Underwater Photography by Carl Roessler. Informative chapters include photographing moving subjects, using available light and a variety of underwater equipment.
Mastering Underwater Photography . . . 9.95

The Nikonos System by Steven Frink. Illustrates how to use your Nikonos system to obtain great results. Also offers travel tips and marketing information on how to sell your photos.
The Nikonos System . . . 9.95



The Underwater Photographer's Handbook
by Peter Rowlands

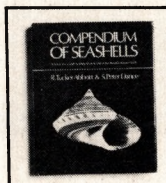
The Underwater Photographer's Handbook by Peter Rowlands. This complete reference book covers subjects from principles and techniques, to equipment.
The Underwater Photographer's Handbook . . . SPECIAL 12.95

DIVE LOCATIONS

Bahama Diver's Guide . . . 19.95
California Dive Boat Guide and Diver's Log . . . 4.95
The Diver's Guide to the Philippines . . . 11.95
Diver's Guide to Underwater America . . . 14.95
Diving and Snorkeling Guide to Florida Keys . . . 8.95
Diving and Snorkeling Guide to Hawaiian Islands . . . 8.95
Diving and Snorkeling Guide to Virgin Islands . . . 8.95

Diving and Snorkeling Guide to Grand Cayman . . . 8.95
Diving and Snorkeling Guide to Cozumel . . . 8.95
Diving and Snorkeling Guide to Bonaire, Aruba, and Curacao . . . 8.95
Diving Guide to Bahamas . . . 8.95
Guide to the Bonaire Marine Park . . . 14.95
Guide to the Curacao Underwater Park . . . 3.95

Caribbean Seashells. A lushly illustrated guide to 830 species of marine mollusks from the beaches and off-shore waters of the Caribbean
Caribbean Seashells . . . 6.95



Compendium of Seashells
by R. Tucker Abbott & S. Peter Dance

Compendium of Seashells by R. Tucker Abbott and S. Peter Dance. This complete general identification book illustrates over 4000 species with photos and scientific names.
Compendium of Seashells . . . 50.00

Guide to Australian Shells. A listing of over 1600 shells found in Australian waters.
Guide to Australian Shells . . . 14.50

GENERAL INTEREST

Advanced First Aid Afloat, Second edition. A guide for people in isolated areas without immediate access to professional medical attention.
Advanced First Aid Afloat . . . 6.00

Complete Guide to Underwater Modeling. This helpful book explores the world of underwater modeling as an artform emphasizing the grace and beauty of the undersea world.
Complete Guide to Underwater Modeling 9.95

Dangerous Marine Animals: That Bite, Sting, Shock, are Non-Edible. Revised edition is packed with information on the identification, distribution, habits and characteristics of dangerous marine animals.
Dangerous Marine Animals. . . 15.00

The Decompression Workbook. A handy workbook designed to help new or rusty divers gain proficiency when using the U.S. Navy Decompression Tables.
The Decompression Workbook . . . 5.95

Diving Medicine. Covers decompression sickness, first aid and emergency treatment, effects of high pressure, and many other topics.
Diving Medicine . . . 39.50

The Joy of Snorkeling by Steve Blount and Herb Taylor. A how-to-book which also contains informative details on underwater photography, fishwatching, shelling other marine topics.
The Joy of Snorkeling . . . 8.95



Samantha
by David Pilosof

Samantha by David Pilosof. A softbound edition of the first book ever devoted to capturing the nude female form in an underwater setting.
Samantha . . . 19.95

Scuba Diving Safety. This useful book explains how to dive safely and follow safety procedures in an underwater emergency.
Scuba Diving Safety . . . 5.95

Scuba Equipment Care and Maintenance. A detailed to the proper care and repair techniques for scuba equipment with illustrations, diagrams and photographs.
Scuba Equipment Care and Maintenance. 9.95

Sharks and Rays: A Handbook of the Sharks and Rays of Hawaii and the Central Pacific Ocean.
Sharks and Rays . . . 7.25

Shipwrecks of Truk. A fascinating collection of photographs of many of the Japanese warships which were sunk in the Truk lagoon during World War II.
Shipwrecks of Truk . . . 14.95

They Found Treasure. Some of the world's most successful treasure hunters reveal their secrets: methods of research, reasons for hunting and salvage techniques.
They Found Treasure . . . 10.00

Touch the Sea by Dee Scarr. This fascinating account of the sea is a true personal experience profiling techniques used during diving classes and tours by dive guide Dee Scarr.
Touch the Sea . . . 12.95



The Undersea Predators
by Carl Roessler

The Undersea Predators. Carl Roessler's first book since his best-selling "Underwater Wilderness" contains magnificent, full-color photos that show all aspects of underwater predation.
The Undersea Predators . . . 24.95

Helix believes underwater photography should be fun, not expensive. That's why the Helix staff is comprised of professionals who can assist you with the diversity of today's photographic equipment. We hope you enjoyed the Best of Helix Underwater Photography Catalog.

If you're not on our mailing list and would like to receive our 1985 Underwater Catalog, 240 title Booklist, informative Photo/Diver Newsletter and Photo/Dive Trip information, call us at 800/33-HELIX and sign up now!

PLACING AN ORDER IS EASY! Simply dial our Underwater Department toll-free at 800/33-HELIX and our staff will take your order using VISA or Mastercard. To order by mail, send a certified check, money order, VISA or Mastercard number and exp. date along with your order to our address listed below.

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(312) 944-4400 Underwater Dept.: 800-33/HELIX

neering for complete information and costs of the courses.

ON THE LIGHTER SIDE

A video dealer in England advertised a large discount on his systems to anyone who was brave (?) enough to snatch a coin from an aquarium filled with hungry piranha. The English equivalent of the SPCA in the United States got into the act and demanded the dealer be sure the customer's hands were cleaned so as to prevent food poisoning in any piranha that might bite a dirty hand. This really happened! 🐟

SCUBA NATIONALS

Divers from eight states recently participated in the Underwater Society of America's Scuba Nationals, hosted by the Great Plains and Oklahoma Councils of Divers at Ogallala, Nebraska. The competition, for teams of two, included spearfishing and scuba skills such as buddy breathing, U/W gear exchange and navigation.

First place winners in the women's scuba skills competition were Becky Casey of Pittsburg, Kansas and Earlena Seward of St. Peters, Missouri. Winners in the men's division were Rick Casey of Pittsburg, Kansas and Steve Thompson from Kansas City, Missouri.

In the spearfishing competition, the winners in the women's division were Stacy Coulson of Kansas City, Kansas and Debbie Phillips of Chilhowee, Missouri. The men's spearfishing winners were Rich Jackson of Scottsbluff, Nebraska and Bryan Holland of Rapid City, South Dakota.

Next year's Scuba Nationals are scheduled for July 19-20 at Table Rock Lake, Missouri. For information contact Jana Bradley, Director of Scuba Competition, Underwater Society of America, 810 West Harris, Frontenac, Kansas 66762. 🐟

BAHAMAS LEARN TO DIVE

A new Learn to Dive program will be introduced for the upcoming winter vacation season by the Bahamas Diving Association, an organization comprising Bahamian resorts, government and industry officials, a stateside diving publication and advertising representatives familiar with the Bahamas.

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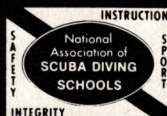
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CARDIAC HILL

Whatever Goes Down— Must Come Up!

TEXT AND PHOTOGRAPHY
BY JIM WALKER

Southern California visitors often include Marineland of the Pacific, on the Palos Verdes peninsula, in their itinerary of "must see" attractions. And, why not? With its whale and dolphin shows, aquarium exhibits and swim-through Baja Reef, the ocean park gives visitors a controlled, close-up look at our exciting coastal animals. But, few non-natives realize that just a couple hundred yards away is a site where the more adventurous can experience many of these animals in an uncontrolled, natural setting. And, this dive site is less than 50 yards from the highway—as the seagull flies, that is!

The dive site is called Cardiac Hill (or path) and if you sense a catch, you're correct. But, first listen to the good news:

Approximately one-half mile east of Point Vicente light on Palos Verdes Drive, and just west of Marineland, you'll find a paved turnout featuring free parking for about 40 cars. (In the summer these spots fill up quickly, so come early.) The site also features restrooms/changing areas and a drinking fountain. This spot is known as Pt. Vicente Fishing Access and the dive site is just below it.

From the parking lot you can enjoy a fantastic view of Marineland, the Pacific Ocean and a wide stretch of coastline. On a clear day you can see Catalina Island across the channel.

After your gear is unloaded and you're ready to head to the dive site, lock your car and leave no items of value in sight. You can don your gear in the parking lot or carry it to the beach. The former allows you to dive without worrying about what you left on the beach, such as clothes, gear bags, etc., but whichever you choose, wear sturdy foot protection on the path to the water.

The diving at Cardiac Hill includes rocky reefs that begin as you step into the water and a thriving kelp bed that begins just 20 yards from the shore. The rocky beach is nestled between Pt. Vicente and Long Point and, thus, is protected to

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Looking west from the cliff top above Pt. Vicente Fishing Access, one can see picturesque Pt. Vicente Light and one of the lower forks of the path at Cardiac Hill.



Ron Akeson makes a dive at Cardiac Hill.

some degree from all swells except those arising directly to the south. This is not to say you won't have to deal with some wave action, but on many days you can jump in the water from one of several large rocks and, in a few kicks, be beyond the pull of the surge.

The U/W visibility at this site is said to average 10-20 feet, but I have never seen it less than 20 and often seen it more than 30, especially within the confines of the kelp bed. This is probably owing to the effects of cold water and a rocky shore. While the water along this part of the coast averages in the high 60s (°F) in the summer and drops about ten degrees in

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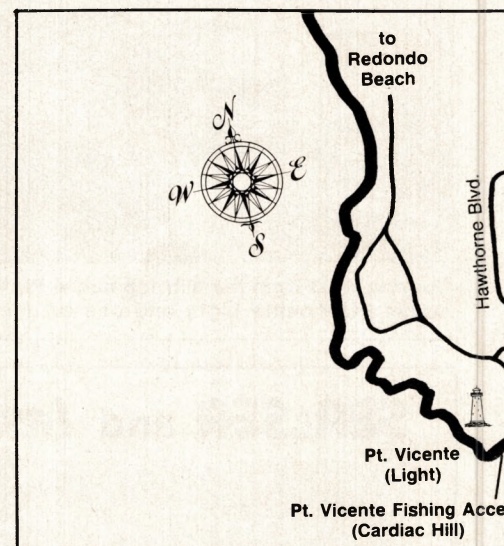
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CARDIAC HILL

the winter, Cardiac Hill always seems to me to be just a touch colder and clearer than other sites in the area.

While any spot along the rocky reef here features a host of small animals suitable for macro photography, most divers will find the kelp bed the most interesting location. Plan your entries accordingly; some parts of the shore are farther from the bed than others. Depths in the kelp bed range from 20-40 feet, so snorkelers will enjoy it too.

Sea urchins dominate the non-kelp areas and occur within the bed. In fact, the urchins graze on the kelp holdfasts and have been blamed, at least in part, for nearly denuding this area of the coast of kelp. Restoration projects have been underway for some time, however, and it



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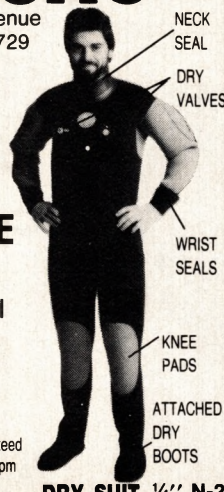
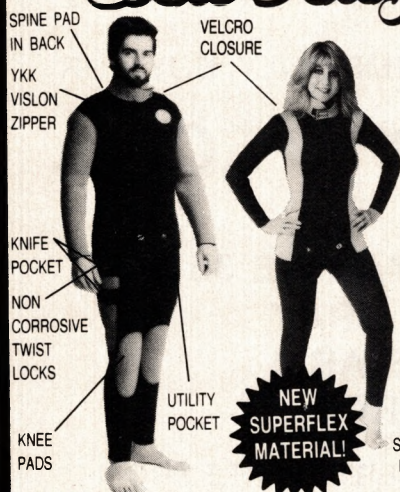
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seems to be making a comeback.

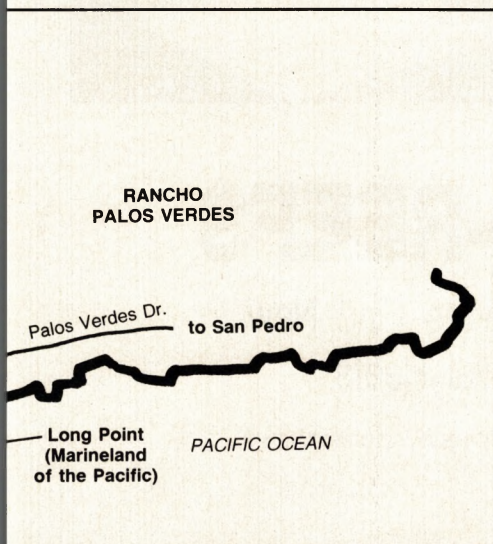
Another organism that needs to make a comeback here is the abalone. Heavy diver pressure and reduced habitat (i.e., kelp) lowered the population of this mollusk to a point where, some years back, California Fish and Game had to close the coast from Palos Verdes Point to Dana Point to its collection. On my last dive at Cardiac Hill I saw many empty, three to four inch shells and no large living specimens. This tells me abalone haven't yet recovered. It's still illegal to collect them here, anyway.

Lobster and other marine edibles can be collected here, in season, but the area receives heavy diver usage. Fish are wary and generally small and big lobsters are rare. Persistence and proper technique can pay off, however.

What Cardiac Hill lacks in big game it more than makes up for in photo potential and scenic beauty. You can cruise through a forest of vertical kelp stalks with the sunlight streaming through in si-

lent splendor. Schools of small fish and lone garibaldi hover in midwater or dart about the kelp and rocks. Occasionally you may see a sea lion observing you from a distance or weaving in and out of the kelp. Close-up photographers can catch a portrait of gorgonian coral or treefish and macro enthusiasts will find a paradise of anemones, tubeworms, urchins, cucumbers, gobies and nudibranchs. And, all this beauty is less than 50 yards from the parking. Of course, that's 50 yards horizontally, which brings us to the bad news.

The diving at Cardiac Hill is at the base of rocky cliffs, approximately 120 feet high. The beach is accessed by a wide, steep path reaching down from Palos Verdes Drive. Lugging all your dive gear down this path is tough, but even so, misleading. It's after your dive, when you must carry that gear back up, when you



photo/Ron Akeson

are tired, cold and anxious to get dry and dressed, that you must face "The Hill." This is when the path seems to be nearly vertical and even the young must pause every few feet during the 10-15 minute ascent. Don't push it, enjoy the view.

Although on your way up you'll curse the climb, soon after you're back in your car you'll begin to forget the bad and remember the good. Soon you'll be thinking again about a dive at Cardiac Hill.

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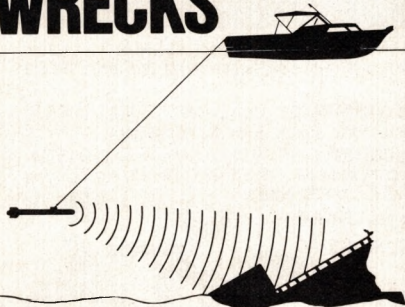
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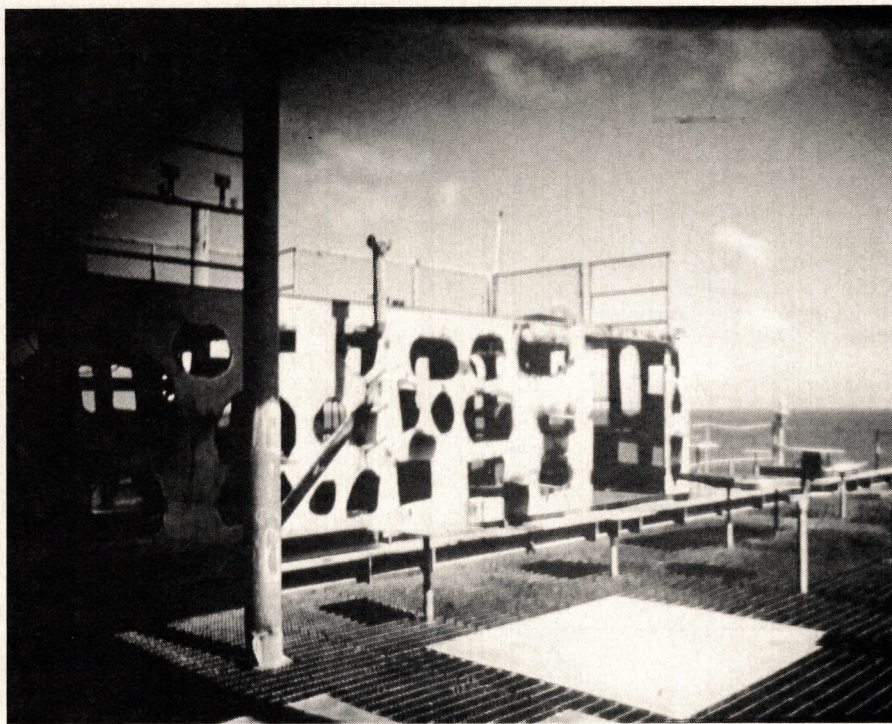
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RIGS-TO-REEFS

Obsolete Oil Platforms Find New Life As Artificial Reefs

TEXT AND PHOTOGRAPHY BY HEYWARD MATHEWS

Several Florida fishing and diving groups are looking forward to seeing oil rigs off their coast. Shades of Santa Barbara—are they crazy? No, the rigs they want are obsolete oil and gas platforms that will be used as artificial reefs. Fishermen and divers off the Texas, California and Louisiana coasts have long known that oil and gas production platforms attract large populations of reef and pelagic fish. Unfortunately, most of these structures are some distance from shore, requiring long trips and large boats to make the dive safely.

The original idea for a national rigs-to-reefs program began under former Secretary of Interior James Watt. Most environmentalists were very suspicious of anything proposed by James Watt, so many concluded that the whole idea was an excuse to let the offshore oil industry walk away from its responsibility for these structures by calling them artificial reefs. It is now evident that converting some of these structures to reefs could mean great habitat improvement in our coastal waters. Objections from the U.S. Department of Defense (DOD) make it likely that few, if any, rigs will be left in place. The

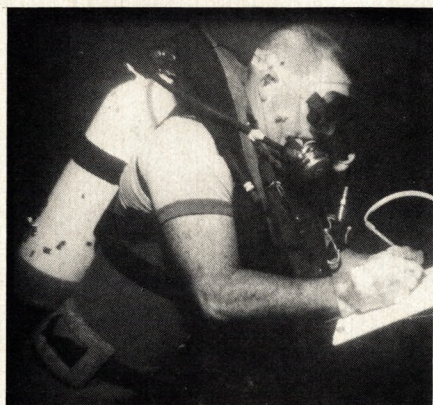
DOD believes that under existing federal regulations and international agreements, once an oil or gas structure has finished its operational life, it must be totally removed from the site. Not only must the structure be cut off 15 feet below the mud line, but any debris around the rig must be removed to restore the bottom for trawling by shrimp fishermen. The Department of Defense is concerned that if the United States should start leaving old structures on site, other nations might do the same thing, resulting in serious problems for anti-submarine operations.

In the past, obsolete structures were removed and transported ashore for scrap. In most instances, cost of removal greatly exceeded scrap value. If the offshore oil industry could donate these rigs to a reef project, they could possibly reap a savings in removal cost and get some tax breaks in the process. Making a fishing and diving reef from an old drilling rig may also offer some public relations advantages and may improve the image of the offshore oil industry with fishermen and environmentalists.

The first reef built from an oil structure was donated by Exxon in 1980 and

placed off Carrabelle, on the west coast of Florida, in 110 feet of water. Unfortunately, political considerations resulted in it being placed in a location that was not very accessible to divers. The site, at Loran C coordinates 14226.7 and 46246.5, is 35 miles offshore. The nearest dive shop is in Tallahassee, 40 miles north, so this reef does not receive much diving pressure and only moderate fishing pressure. Many private boats in this area are not equipped for going out this far.

The Exxon reef was not a production platform but a template used to develop submerged production technology. It is some 60 feet high and almost 80 feet square at the base, with large tubular



photo/Dan Sheehy

Dr. Heyward Mathews makes a transect fish count on the Exxon reef. Obsolete oil and gas platforms can be utilized as artificial reefs, attracting large populations of fish and creating exciting dive sites.

legs, crossbeams and assorted pipes and other structures forming an open cube on the seafloor. The author has made several dives on the structure, the most recent in the fall of '84. Visibility varies from 30 to more than 100 feet and the reef is always populated with large numbers of amberjack up to 75 pounds and barracuda five to six feet long. The lower parts of the structure have good numbers of black and red grouper, red snapper and numerous smaller food and tropical species of fish. While the bottom is at 110 feet, most of the dive is usually spent at the 70 to 90 foot levels. If you still have any bottom time left after the dive on the template, only 200 yards away there is a large Air Force microwave tower. The tower is circular and extends up some 100 feet into the air. Its base is a large steel barge filled with rock. This tower is visible for many miles, so it does not require fancy electronics to locate. On our dive we shot more fish on the tower and barge than on the template, but that was probably because another boatload of divers was diving the template when we arrived. Some of the black grouper we speared weighed as much as 20 pounds and several that would not let us get within shooting range looked to be more than 30 pounds.

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RIGS-TO-REEFS

The second reef was donated by Tenneco Oil Company. This reef is in a better site because the Florida Department of Natural Resources sought some suggestions from a charter boat captain who was also a diver. The site is 22 miles off Pensacola and 28 miles off Destin, allowing boats out of each area to utilize the reef. Depth for this reef is 170 feet to provide a greater than usual clearance over the top. The main part of the reef is the "jacket" structure, which was cut off with explosives and placed on a large



Tenneco Oil platform on a barge, being

barge for the trip to Florida. Once on site, it was winched off and fell in a horizontal position at Loran C coordinates 13324.5 and 47012.5. The drilling deck was placed several hundred yards to the north. The wider end of the tower extends up to within 90 feet of the surface. On our dive in November there was a strong current running from top to bottom, so we spent most of our time on the upper parts of the leg structure, working down to the 130 foot level. The visibility was over 100 feet, so we could see the entire structure once we reached the edge of the rig. There were large amberjack circling the reef and several large barracuda.

A third oil rig has been converted into an artificial reef off the coast of Alabama. This reef was built exclusively for anglers at a depth of 240 feet. To place the structure, large flotation tanks were secured to its side prior to its being blown free from the bottom with explosives. Once the tanks were filled with air, the rig moved into a horizontal position and was then towed to the drop site by a tug. When the bolts holding the flotation tanks were blown, the rig fell to the bottom lengthwise. This eliminated the need for large

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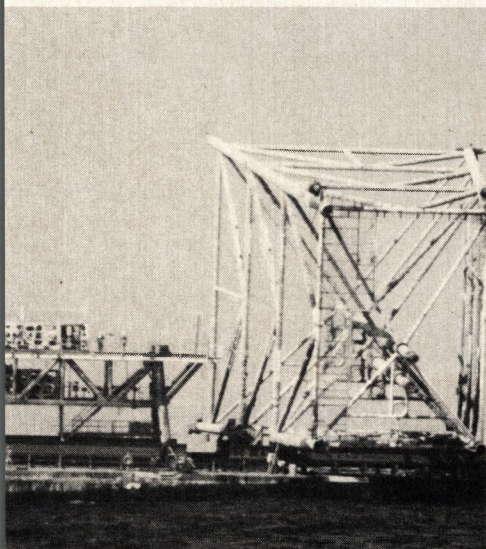
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barges and cranes, reducing the cost of removal and transportation.

Future Florida reefs utilizing these oil and gas structures will be sited in 120 to 150 foot depths to provide a minimum of 50 feet of clearance over the top to prevent a hazard to navigation. The lower east coast of Florida has deep water close to shore to accommodate the structures but off most of the rest of Florida the continental shelf has a more gradual slope, requiring longer distances offshore. It is possible that once the rig has been removed from the bottom and is in a horizontal position under the flotation tanks, the lower half could be cut loose with explosives and then one half



transported to a reef off Pensacola, FL.

dropped at one location and the other half placed nearby. This would cut down the profile, but it would allow the use of these structures closer to shore.

There are an estimated 4,000 oil and gas structures operating in the Gulf of Mexico today and several hundred are scheduled to come off production in the next few years. Needless to say, the economics of removal will ultimately determine how many structures become artificial reefs for divers and anglers. Tax advantages will be a major factor in this decision, so hopefully the IRS will be kind to the offshore oil industry and, thus, provide long-term benefits for the entire marine community.

Several areas, including Pinellas County on Florida's west coast, have already obtained necessary permits for deep water sites to accommodate these obsolete oil and gas structures, and other counties will follow once these structures become available. While these high profile artificial reefs will never have the natural beauty of a coral reef, they do support very large populations of grouper, snapper and several pelagic species, and make excellent diving sites. 

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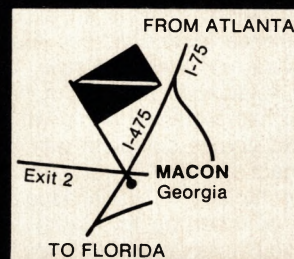
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THE TUSA JACKET

A Colorful, Functional BC

TEXT AND PHOTOGRAPHY BY BONNIE J. CARDONE

Hot pink and turquoise aren't exactly common colors for sporting goods. And, up until this year, if those were your favorite colors you were out of luck when it came to most scuba gear. You could buy hot pink wetsuits, but getting anything to match wasn't easy. Tabata has changed all that. This company sells hot pink fins, masks, gloves, snorkels and even a hot pink/turquoise jacket BC. The popularity of this color has taken the company by surprise. Tabata USA (TUSA) ordered a few pink items from the parent company in Japan and soon discovered it was impossible to keep them in stock. Women loved this departure from the traditional and the gear was photogenic as well.

The colors of the TUSA BC pictured here are very striking. The top of the front is hot pink, separated from the turquoise bottom by a navy stripe. Bright yellow piping and navy edge trim complete the color package.

Our lives depend upon our equipment, however, so no matter how pretty a piece of gear is, it also has a job to do. The TUSA jacket performs very well. It has all the standard features and some extras. There's an inner bladder of polyvinylchloride (PVC) and an outer bladder of Cordura nylon. There's an adjustable quick release buckle across the chest and a wide, cummerbund style, Velcro® closing waistband. The top of the right shoulder has a manual dump valve.

The BC comes complete with a quick disconnect power inflator. This has a large mouthpiece for oral inflation as well. Instead of inserting this latter in your mouth, you merely press your lips against it and blow to inflate the vest.

One of the TUSA jacket's special features is its padded shoulders. Thick strips of form polyethylene are placed inside the nylon bladder to distribute weight so the BC doesn't dig into your shoulders.

Both of the TUSA's front pockets are cut low on the outside so they can be used to store an octopus second stage. These close with Velcro and have mesh panels on the sides and bottom. Under the left pocket there is a 25 gram CO₂ cartridge.

The TUSA jacket has a molded plastic backpack held in place with nylon webbing. The easy-to-pack nylon webbing tank band has a nonslip neoprene backing. Before you put the band on your tank you should wet it, then tighten it carefully to avoid slippage.

The TUSA BC has a nylon D-ring just above the right pocket for accessories. Above the left pocket is a Velcro closing hose guide for an octopus or pressure gauge hose. There is a whistle attached

to the oral inflator hose.

SDM tested the TUSA jacket on a two day trip to the Northern Channel Islands. It was a very comfortable system. The waistband allowed me to adjust it for a snug fit. Topside it floated me head and shoulders above the surface. Underwater, I felt well balanced wearing it and it stayed close to my body. I wet the band, put it on the tank and never had to make any further adjustments.

The TUSA BC jacket is a very attractive, very functional BC. It comes in small, medium and large and sells for \$320 at your Tabata dealer. If hot pink isn't your color, Tabata also has BCs in yellow, navy, light blue and combinations of these colors. 



The TUSA BC has a Velcro closing, nylon webbing tank band, a stainless steel buckle.

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Forty-four Instructor candidates—an all-time record—enrolled in PADI International College's fourth Gold Curriculum program of 1985. This eight-week course provides training in retail operations, equipment repair and how to conduct PADI diver training at beginning and advanced levels.

The college's Dean, Jim Williams, attributes this figure to two factors. First is the college's reputation as a training center for diving educators and professionals. Second is the fact the college now has over 300 requests for Gold Curriculum graduates—far more than it can possibly fill. Many of these positions offer starting salaries from \$18,000-\$25,000.

More information on Gold, IDC and Postgraduate Curriculum programs is available by contacting PADI International College, 1243 East Warner, Santa Ana, CA 92705.

ROSENBERG AWARD

Marc C. Brakebill of Santa Barbara was the recent recipient of the second annual Jerrold Rosenberg Award, presented by the Undersea Medical Society and the College of Oceaneering. Brakebill finished first in his College of Oceaneering diver medic class with an overall grade average of 96 percent. He previously spent seven years in the United States Navy involved in various diving operations and held positions as petty officer, diving supervisor and jump master.

The Jerrold Rosenberg Award was established as a means to recognize diver medics who provide that extra measure of safety to the health and welfare of their co-divers in the field. Rosenberg was an avid and experienced scuba diver who lost his life in a sport diving accident in 1983. His widow, Debbie, made the presentation to Brakebill.

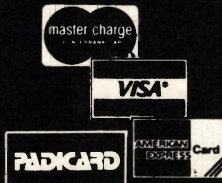
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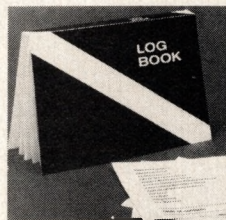
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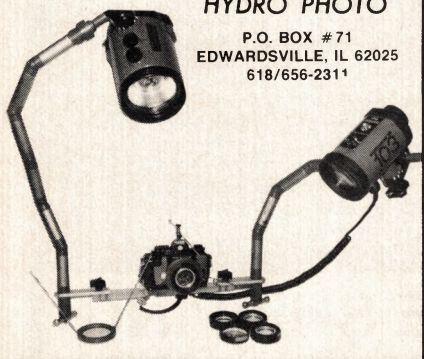
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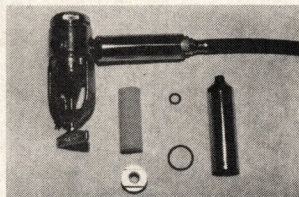
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ADVENTURE WORLD

(Continued from Page 64)

es of equipment and luggage to shoot an eight minute segment for Bill Burrud Productions. The Burrud Group, long known for its interesting animal shows, landed a contract for 13 half-hour shows called Bill Burrud's Adventure World. Each is comprised of one, four minute and two, eight minute segments highlighting the adventures of ordinary people. Wassel sold



Jack McKenney films the PC 8 submarine

Burrud on the story idea of a couple living in Grand Cayman (Ron and Kathie Kipp) searching for treasure. Research Submersibles Limited wanted exposure for its new Cayman operation and Kipp realized it would lend a lot of production value to the segment, so he put it all together for us. I was excited because in all my years of diving I had never looked out at the ocean floor from inside a dry submarine.

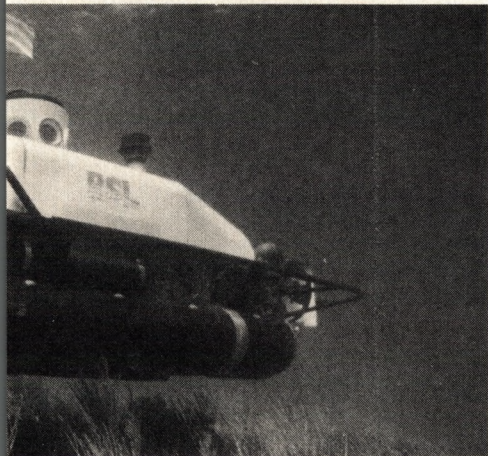
John, Budd and I landed at the new Georgetown airport with our mountain of gear and were whisked off to the newly renovated Cayman Diving Lodge at East End by Kipp and Pat Scharr. She is a NAUI board member and part owner and general manager of the lodge.

Directing this kind of television segment is done by the seat of your pants because the storyline is laid down and developed as you go. It's a documentary *cinema verité* style of shooting. Wassel, who specializes in TV commercials and had no prior experience with underwater production, was a quick study and put together a storyboard highlighting the sub, Scharr and the Kipps in search of a wreck that Ron fervently believes slid over the wall not far from the lodge during a storm. The belief is based on an old anchor discovered in 35 feet of water in a coral crevasse and various ship's artifacts found nearby.

The segment leads off with an introduction to Grand Cayman's diving delights,

from the modern *Ore Verde* shipwreck off the Holiday Inn beach to the superb wall diving at East End. It then introduces the Kipps, Pat Scharr and Elita Soto, to get the audience into the theme of the piece.

Cramped inside the tiny sub I realized the advantages of working in a one atmosphere environment and not having to worry about decompression. Yet, when it came right down to it I much preferred swimming in the ocean. On the last day of our filming we planned to get a shot of Ron in the submarine emerging over the wall and descending to about 700 feet to search for the shipwreck. Because of the high humidity the sub blew a fuse. Since



over the reef off Grand Cayman Island.

the main thruster wasn't working, we had to fake the shot by having Kathie, Budd and Pat physically push the five ton sub over the ledge. It worked vertically on its own, so once it was over the edge we got the necessary shots and everything went very smoothly.

I made another descent in the sub to get some deep water point-of-view shots searching for the wreck and was amazed at how well it maneuvered without a main thruster. Stewart Maison and I descended to 350 feet, where there was only a sloping sand and coral rubble bottom, spent 30 minutes working, then made our ascent in just a couple of minutes.

We didn't find the shipwreck, but Ron and Kathie intend to continue the search whenever possible. Listening to Ron's enthusiasm during the filming made it quite evident he has a bad case of what we call treasure fever.

Although there was no payoff, the real excitement came in the search for the deep unknown shipwreck—ordinary people caught up in the adventure of doing out-of-the-ordinary things. The series will include segments about survivalists, a day in the life of a fighter pilot and free climbing, along with numerous other exciting vocations and avocations our neighbors, friends and fellow countrymen are involved in. Bill Burrud's *Adventure World* should prove to be a very entertaining television series.

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Oceanic's Silicone Prismatic II Mask



Ultra Wide View—

Have you ever lost sight of your buddy in clear water when you knew he/she was only a few feet away? As you sweep the underwater terrain with the narrow field of vision afforded by your mask, rotating your body as you look, your buddy, swimming in the same direction you are turning, stays just out of view. This underwater ballet can continue for several seconds, until you lose your patience and reverse your rotation, or decide he/she has fallen into a time warp, and head for the surface.

This is just one instance where a mask offering a wide angle of view could come in handy. Increased angle of view can enhance all underwater activities, but previously the turn-off to a wide angle mask (i.e., one with side windows) was the large size and related high volume.

The Silicone Prismatic II mask from Oceanic offers the benefits of wide view underwater while maintaining relatively small size and low volume. I use the term relatively for a reason. The Prismatic II is not a mini mask. While it measures only six and one-quarter inches across the frame, the tempered glass front lens (one piece) is three inches deep. This large lens, combined with two small side windows, offers nearly 180 degrees of view, side-to-side and top-to-bottom, without any distortion. However, the mask frame is anatomically designed to curve around the face, allowing the lens to be set in close. Consequently, the mask is low vol-

ume. According to Oceanic, the Prismatic II is the lowest volume wide angle (with a one piece front lens) mask available.

The outer frame of the Prismatic II is made of tough polycarbonate. It comes in transparent blue, red or smoke to coordinate with your other dive gear. (Matching snorkels are available.) The lenses are secured in a black ABS plastic mini-frame, which is sealed to the outer frame. The combination allows the outer frame to be large and, thus, avoid pressure points, while the overall mask volume is kept low.

The skirt of the Silicone Prismatic II is, of course, silicone rubber—hypoallergenic and resistant to breakdown by ozone and ultraviolet light. Its soft double face seal is comfortable and should accommodate a wide variety of faces easily. The diameter of the opening where the skirt actually touches the face is much smaller than the mask frame. This not only helps keep the mask low volume, but also keeps the frame away from the face for comfort.

One of the nicest features of the Prismatic II is the method of strap adjustment. With Oceanic's patented Mask-Lok system, the ribbed strap ends slip around rollers at the sides of the mask and are held in place by spring loaded clamps. Pressing down on the edge of a clamp will open it, allowing the strap to slide in either direction. Loosening the strap can be done one-handed, even underwater.

Still Low Volume

BY JIM WALKER

photos/Bonnie J. Cardone



The combination of a large front window and small side windows gives the Silicone Prismatic II mask nearly 180 degrees of view, side-to-side and top-to-bottom. The opening in the skirt where the mask fits on the face is small, helping keep the mask low volume. Spring loaded clamps allow easy strap adjustment, even underwater.

Tightening the strap is even easier—just pull on the end of it. You don't have to touch the clamp. Strap overlap is held in place by black plastic guides.

The Silicone Prismatic II mask comes with a limited one year warranty and retails for \$75. With a wide view, easy adjustment, comfort and good looks it's a real winner. Visit your Oceanic dealer and try one on. For dealer information contact Oceanic, 14275 Catalina St., San Leandro, CA 94577. 

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AQUA AMIGOS

The Aqua Amigos Scuba Club, Inc. is a non-profit corporation in Ohio. It is one of the oldest existing scuba clubs in the state (founded December 8, 1958, in Painesville). The purpose of the club is to promote education in scuba diving to the general public and membership, and to promote fellowship, sportsmanship, science and conservation within the sport.

Although diving is the club's most important pastime, it also offers a wide range of non-diving activities. These include skiing, bowling, picnics, canoe runs, clambakes and parties. Membership is not limited to divers; anyone interested is welcome to join.

The club meets at the Euclid YMCA in Euclid, Ohio on the second and fourth Wednesday of each month at 8:00 pm.

IAMAT

Statistics indicate that this year 21 percent of Americans traveling to foreign countries will experience illnesses ranging from minor irritations to serious conditions. One in five of these will seek a physician's advice. The incidence of travel-



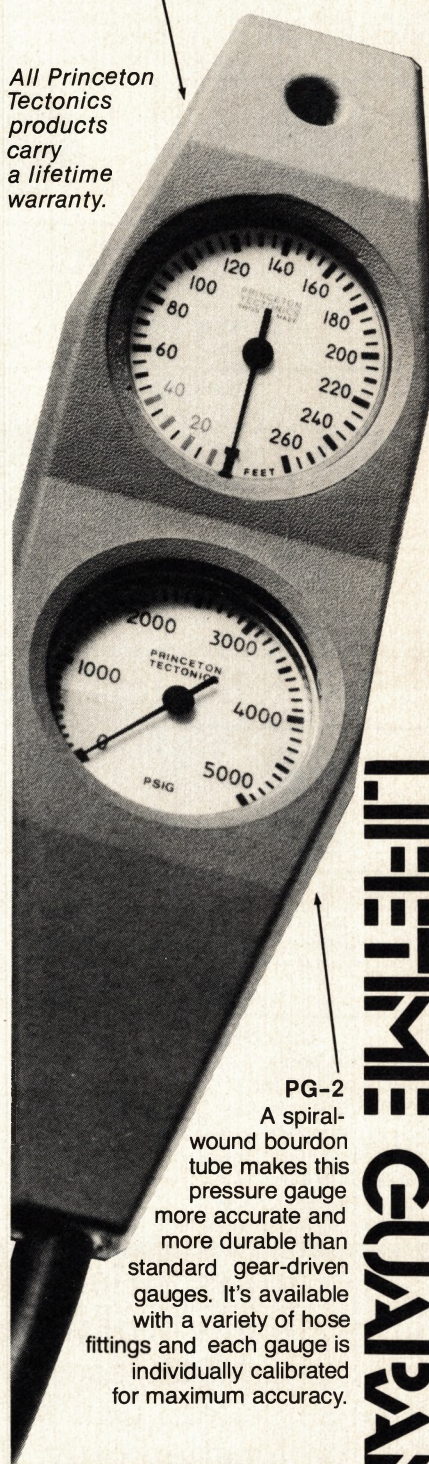
er's illness has spawned a new medical specialty, hodoiporiatics. The name was coined by the International Association for Medical Assistance to Travelers (IAMAT), which has been researching such conditions for 25 years.

IAMAT compiles, and distributes to its members, a directory of English speaking doctors in foreign countries who charge moderate fees. There is no cost for membership, but donations, which are tax deductible, are accepted. For membership information contact IAMAT, 736 Center Street, Lewiston, NY 14092; (716) 754-4883.

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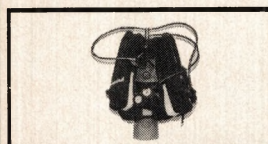


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THE VISION QUEEN OF THE CALIFORNIA DIVE BOAT FLEET

TEXT AND PHOTOGRAPHY
BY BONNIE J. CARDONE

First there was the *Truth*, then the *Conception* and now there is the *Vision*. All three of these dive boats are owned by Roy Hauser and Glen Fritzler of Truth Aquatics, Inc., in Santa Barbara, CA.

Eleven years ago I was on one of the *Truth*'s maiden voyages. I thought it was fantastic. It has built-in mask rinsing boxes at the gates; a galley that seats everyone at the same time; a very large boarding ramp; a sundeck; comfortable, well-ventilated bunks; two heads; two on-deck showers; and two compressors. The *Truth* is 65 feet long and 17 feet wide. On that April day in 1974, I couldn't imagine a more perfect dive boat.

Four years ago Truth Aquatics built the *Conception*, designed for multi-day trips.

her triumphant entrance into Santa Barbara harbor and I was there. She is aptly named. I hate to say it, but again, I can't imagine a more perfect dive boat!

A bigger, improved version of the *Conception*, she is 88 feet long with a 26 foot beam. Her galley is huge, with a food preparation area that is a galley girl's dream. Everything is oversized, from the electric grill to the double stainless steel sinks. There is lots of tiled counter space. Since salad is an integral part of a Truth Aquatics multi-day trip, there is a built-in salad bar.

On the main deck there are three heads and a water fountain just below an instrument panel that tells you water depth and temperature as well as wind speed. There is also a deck clock so that



The *Vision*, berthed in Santa Barbara, offers multi-day trips to sites off So. Cal.

time aboard the boat can be standardized. Of course the boarding ramp has live wells for game storage, there are mask rinsing boxes at the gates and two compressors means you never have to wait for an air fill.

Below decks in the stern there is a wet-suit drying area; a clothes dryer for towels; and freezers that can be used for game storage.

The bunkroom features extra large bunks with the usual amenities found on the other Truth Aquatics boats: curtains; pillows and blankets; reading lights; and shelves for sundries. Air is kept circulating continuously by fans. There is a changing room in this area as well.

The *Conception* has a below-decks shower room but the one on the *Vision* is larger and better arranged. There are two showers and a tiled counter with two sinks and mirrors. In this same area there is a darkroom in which the owners intend to install E-6 slide processing equipment.

The top deck contains a spacious sundeck, crew bunks and showers and the wheelhouse. This latter has all the latest navigational equipment: Loran, radar and even an eight color fathometer that distinguishes among schools of fish, kelp, rocky outcroppings, etc.

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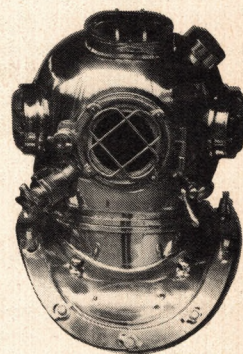
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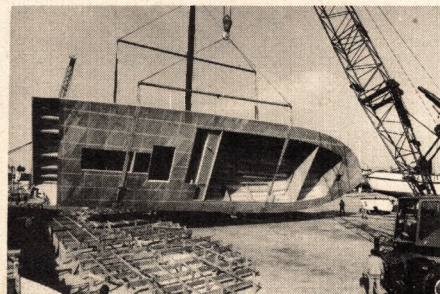
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photo/Mike Farley



The turning of the *Vision*'s hull. The huge dive boat, owned by Roy Hauser and Glen Fritzler of Truth Aquatics in Santa Barbara, California, is 88 feet long and 26 feet wide.

On my first time aboard her, I thought I had died and gone to dive heaven. She is 75 feet long, with a 25 foot beam. In addition to the wonders I found on the *Truth*, the *Conception* has two below-deck showers; bunks with curtains, reading lights and shelves on which to keep life's little necessities; a drying room for wetsuits; a clothes dryer for towels; live wells on the boarding ramp for game storage; a saltwater aquarium; an even bigger sundeck; and three heads instead of two. The bunk area has loads of storage room. The *Conception* is a bigger, better and newer version of the *Truth*: In September 1984, I couldn't imagine a more perfect dive boat.

In August of this year, the *Vision* made

Diving News From Down Under Hayman Island Redevelopment

TEXT AND PHOTOGRAPHY BY GERI MURPHY

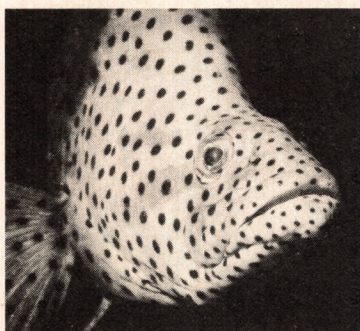
Ansett Hotels and Resorts is spending \$100 million on the reconstruction and expansion of Hayman, a lovely, semi-tropical resort island on Australia's Great Barrier Reef. This past summer the resort closed for renovations that will take 18 months to complete. It is scheduled to reopen in November 1986, just in time for the height of Australia's Great Barrier Reef diving season.

Hayman Island has long been a popular vacation resort for thousands of Australians who seek sun, sand, sailing and watersports. The resort was originally designed by the imaginative Reginald Myles Ansett, founder of Ansett Airlines. It opened in July 1950 and has undergone steady improvement and development over the years.

Hayman is one of 74 small islands in the Whitsunday Group, in the center of the Great Barrier Reef. It is 15 miles off the Australian coast, only 18 miles from the outer edge of the Great Barrier Reef. It is ideally situated to offer high quality Barrier Reef diving, plus all the comforts and conveniences of a first class resort.

The Ansett reconstruction plan is one of the largest and most aggressive island resort development programs in the history of Australia. Currently under construction are 225 rooms and villas, capable of hosting 500 guests. There will be four separate dining rooms, three swimming pools, a hotel shuttle train and a 34 berth marina. Sports facilities will include tennis and squash courts, bowling alleys, and a complete health spa and exercise center. The showpiece of this new resort will be a spectacular manmade lagoon with a freshwater swimming pool in the center. A terraced three story complex with rooms and suites will be built on the edge of the lagoon, facing out to sea.

Ansett is changing the name of the resort from Royal Hayman Hotel to Ansett International Hotel/Hayman Island. The entire project is under the careful supervision of general manager Denis Richard, one of Europe's leading hoteliers. Richard, a graduate of the world famous Swiss Hotel School, Lausanne, was brought to Australia by Ansett's joint managing director, Sir Peter Abeles, to advise on the multi-million dollar upgrad-



The barramundi cod (left) is one of many fish found on the Great Barrier Reef. The outer edge of the reef (below) is 18 miles from Hayman Island.



ing program.

It is Ansett's intent to transform Hayman Island from a popular Australian resort to a world class vacation resort, in hopes of attracting visitors from Canada, the U.S. and Europe. As part of this new redevelopment program, Ansett plans to build a complete diving facility that can accommodate overseas visitors.

Ansett has commissioned the construction of a new 60 foot, high speed dive boat. This custom built craft will be the first to offer daily access to the outer Great Barrier Reef. It will depart every morning from the hotel and offer multiple dives, with lunch served on board.

As base support for Hayman's new boat, Ansett is constructing a new full service dive center on the hotel premises. It will rent dive gear, U/W cameras and arrange daily dive charters. Snorkeling and scuba training will also be available.

Hayman Island's dive center and boat will be operated by Tony Fontes and Maureen Prior of Barrier Reef Dive Services. They have conducted diving trips and scuba instruction in the Whitsunday Islands for five years and have an excellent reputation for safety and service.



Tony is an expatriate from Santa Cruz, California, and a PADI master instructor.

The new Ansett International Hotel/Hayman Island is approximately a two hour jet flight from Sydney. Ansett Airlines Boeing jets land on the new airstrip at nearby Hamilton Island and guests are immediately transferred to the 115 foot, super high-tech launch, *Sun Goddess*. Sipping champagne, they are taken on a luxury cruise through the calm waters of the Whitsunday Islands. Room assignments are taken care of during this trip and 40 minutes later guests are met and transferred to their rooms by a modern mini-train system.

For more information contact Dive In Australia, 680 Beach Street, Suite 340, San Francisco, CA 94109; telephone (415) 928-4480. ✉

VISION

While the *Truth* now has some single day trips, most of the trips run by the *Conception* and *Vision* will be multi-days. While the physical facilities are very important, you get more than comfort on a Truth Aquatics trip, you also get service. The crews on all three boats are considered among the most attentive, friendly and competent of any found on the West Coast. There is always someone on the stern to help boarding divers and tanks are filled promptly.

Food, air and nonalcoholic beverages are included on multi-day trips. Don't expect to lose weight, the meals are gour-



Roy Hauser (right) and Glen Fritzler celebrate the debut of their new *Vision*.

met. In between dives there are quick energy snacks and fruit. Supper starts with hors d'oeuvres, progresses to a salad bar and then to an entree such as stuffed chicken breasts. There's dessert, too.

The diving is limited only by your energy and the no decompression tables. If you can avoid stuffing yourself at supper, you can even make a night dive.

I'm afraid to ask Roy and Glen if they think there's another dive boat in their future: Right now I can't think of a single way they could top the *Vision*.

For chartering information on the *Vision*, *Conception* or *Truth*, write Truth Aquatics, Inc., Sea Landing Breakwater, Santa Barbara, CA 93109 or call (805) 962-1127 and ask for Roy. If you'd like to get on a trip already chartered by another organization, write to the same address and ask for a calendar. Please include a stamped, self-addressed envelope. ➤

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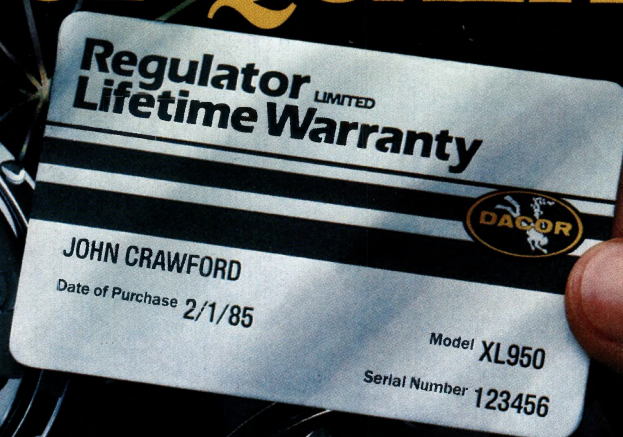
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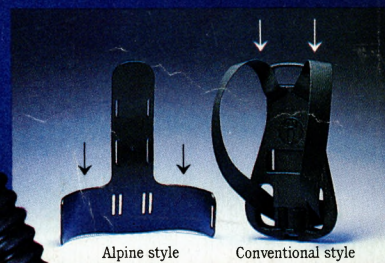


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Nobody makes a tougher outer bag than U.S. Divers. Made of durable nylon, it resists punctures, time after time. And it features a tank carrying harness for ease of handling.



We've applied for a patent on this one: our unique Sea Band cummerbund. Once set on the surface, it automatically compensates for the compression of your wet suit throughout your dive. No more needless adjustments.

The new J.M. Cousteau BC from

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